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# China Report

AGRICULTURE

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## CHINA REPORT AGRICULTURE

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SELECTIVE DEVELOPMENT OF MECHANIZATION IN AGRICULTURE EXPLORED

Beijing NONGYE JISHU JINGJI [ECONOMICS FOR AGRICULTURAL PRODUCTION TECHNOLOGY] in Chinese No 7, Jul 83 pp 8-11

[Article by Zhu Peiwei [2612 1014 1983] and Wang Fu [3769 7450] of the faculty of the Chinese Rural Development Research Center and the Agricultural Machinery Bureau, Ministry of Agriculture, Animal Husbandry and Fishery]

[Text] In order to carry out the strategic task of developing the nation's agriculture within this century, and to transform agriculture from a self- and semiself-sufficient economy to one of large-scale commodity production, from traditional to modern agriculture, while continuing to stabilize and consummate the contract responsibility system linking remuneration to output and implementing the party's various economic policies concerning the rural areas, we have to keep on with the restructuring of agricultural technology and develop agricultural mechanization selectively.

Experiments in agricultural mechanization started in the early 1950's in our nation and have achieved some development in the last 30 years. By 1982, the total power of the entire nation's agricultural machinery reached more than 220 million horsepower. Included were over 3.09 million agricultural tractors of various types. The total output value of the agricultural machinery of communes in the rural areas has already come close to 40 billion yuan. Mechanization of agriculture has become an integral part of the forces of agricultural production. Viewed from the entire nation, mechanical power is responsible for almost half of the workload of agricultural production, and in some areas (such as the three provinces of the Northeast) the proportion is even higher. The development of agricultural mechanization plays an important role in improving production conditions, developing agricultural production and making the rural economy prosper, etc. However, the influence of the mistaken "leftist" ideology--which put forward the impractical slogan "realize mechanization of agriculture on the whole" by pursuing over 70 percent mechanization of the so-called main work, agriculture, forestry, animal husbandry, sideline production and fisheries identically and arbitrarily across the entire nation; depending on uncompensated state investment and bank loans for funds; and adopting administrative measures for the distribution, centralized purchasing and monopolization of the sale of machines--all contributed to the failure to bring the peasants' enthusiasm for mechanization into full play and resulted in serious waste. After the 3d Plenary Session of the 11th Party Central Committee, continuous efforts have been made to conquer the mistaken "leftist" ideology. The conditions have been improved gradually.

Currently, the relations of production in our country's rural areas are undergoing a great change. The contract responsibility system linking remuneration to output has been commonly practiced in the rural collective economy, of which the family contract system linking remuneration to output has become the main form. This has brought new conditions and new problems to agricultural mechanization. Compared to our rich manpower and resources, we have few funds and sources of energy. In such a situation, what is the prospect for the development of the mechanization of agriculture in the future? How should we do it? These are questions of common concern.

## I.

The realization of modernization is impossible without mechanization. The mechanization of agriculture is an integral part of the modernization of agriculture. Up to the present, we have not found any modernization without mechanization in foreign countries which have basically realized the modernization of agriculture. Even in a country like ours which practices the family style of management in rural areas, the realization of the modernization of agriculture still cannot be done without the mechanization of agriculture. It is hard to imagine how a country which is still using traditional human and animal power in its agriculture can realize the modernization of agriculture. Marx said: "The distinction of different economic stages is not in what is produced but in how production is done and what kind of labor is used for production." ("Capital," Vol 1 p 204 [Chinese edition]). Of the means of labor, first come production tools. The development level of production tools indicates people's capability of governing nature and the development level of the society's productive forces. Currently, advanced tools of production in agriculture mainly appear in the replacement of animal power as well as in manual operations by machinery in agriculture, forestry, animal husbandry, sideline production and fishery. In the course of developing our nation's modernization of agriculture and the development of agricultural production, the position and function of agricultural mechanization cannot be neglected. The practice of the contract responsibility system linking remuneration to output in rural areas in recent years has also proved that even in places where the double-contract responsibility system is practiced most commonly, agricultural machinery (especially small-size agricultural machinery) still plays an important role. Besides, based on the contract responsibility system linking remuneration to output, the mechanization of agriculture has been developing even more solidly. For example, Anhui, the province which practiced the responsibility system the earliest and the most extensively, has had an increase of more than 70,000 small-size tractors after practicing the double-contract system for 4 years, equaling the total of the past 20 years. Moreover, all the increases in new small-size machinery were bought by the peasants with their own money. Up to now, the small-size tractors owned by individual peasants and jointly managed by several households reached more than 110,000, making up more than 76 percent of those owned by the entire nation. Huaiyuan County, Anhui, has increased its small-size tractors from 1,468 to more than 11,000 in over 4 years ever since it implemented the double-contract system in 1978. The increase in small-size agricultural machinery has had a great effect in improving the quality of work, racing against the season and seizing the proper time for agricultural work,

etc., and helping grain production to increase on a large scale. The total grain output of the entire province increased from more than 500 million jin in 1978 to more than 1.2 billion jin in 1982. This fact vividly explains that even where family contracts are commonly practiced in the nation's rural areas, we still need mechanization. It is essential for developing the collectively owned cooperative economy in the rural areas and has a significant meaning in changing the peasants' mode of production and their psychological habits. Lenin once pointed out: "It is a matter of several generations to transform small peasants and their psychology and habits as a whole. Only when technology is present, when tractors and machines are widely used in agriculture and when electrification is practiced on a large scale, can the problems of the small peasants be solved, can their entire mind, we may say, be made sound and perfect. Only through these means can we transform the small peasants fundamentally and rapidly." ("The Collected Works of Lenin," Vol 32 p 205 [Chinese edition]) Lenin's instructions concerning the mechanization of agriculture still have an important and practical meaning for our nation's peasants today after the introduction of the contract responsibility system linking remuneration to output.

## II.

To develop the mechanization of agriculture selectively is to undertake a conscientious study and selection of different areas; of work under different natural and economic conditions and different agronomic requirements; of the local supply of machinery; of the peasants' demands; and of the time and place order of mechanization, thereby deciding the focal point, speed and steps for the development of mechanization of agricultural work in different areas. For example, the current mechanization of cultivation in the north of the country, of irrigation and drainage in the south, of the crop-shifting work in the plain areas and of moving work in the mountain areas is practiced more widely as a result of the peasant masses' selection, after weighing the technology and economies for different production needs and the agronomic requirements in different places. Under the current new situation in the rural areas, the selective development of agricultural mechanization is even more significant in the following respects:

1. It suits the strengthening and the developmental needs of the contract responsibility system linking remuneration to output in the rural areas. Ever since the introduction of the responsibility system in the rural areas, the peasants gained the right to decide for themselves in production as well as in the selection and management of agricultural machinery. They can choose, according to their needs for the tasks contracted and their financial situation, the proper machinery for work projects in different places, buy the kind of agricultural machinery which suits their needs and thereby permit the healthier and more solid development of the mechanization of agriculture on a new basis.

2. It is advantageous to suiting measures to local conditions and raising the economic results. For example, the two prefectures of Anhui Province, Suxian and Fuyang, which have smooth terrain, few people and an abundance of land, are suitable for machine cultivation. After the introduction of the

double contract system, individual peasants and combined households bought a total of more than 20,000 small-size tractors and almost doubled the number before the introduction of the responsibility system. In Xuancheng Prefecture, which is mostly paddy field, irrigation and drainage machines are urgently needed by the masses. Compared to 1979, the number of walking tractors in 1981 decreased by about 10,000, but the number of small-size water pumps increased from over 20,000 to over 40,000. This kind of adjustment to local conditions helps to increase economic results by a large scale.

3. It is advantageous to the current development of specialized households and priority households in the rural areas. According to the incomplete statistical data of eight provinces, Shanxi, Henan, Hubei, etc., the proportion of general specialized households is only 7-8 percent of all peasant households. However, the commodity ratio of the agricultural and sideline products they produce has reached 60-70 percent. Despite their small production scale, their intensive management increases labor productivity by several times to over 10 times that of general peasant households. Therefore, they urgently demand mechanization. In order to support the development of grain specialized households and priority households enthusiastically, it is not enough to depend simply on human and animal power. We should selectively supply machinery which suits local conditions, and use it to replace part of the human and animal power.

4. Selectively develop the mechanization of agriculture, make it tally with the peasants' economic conditions and suit the current level of purchasing power in the rural areas.

According to the actual situation in the rural areas of our nation, agricultural production will still be combining mechanization, semimechanization with manual tools and human and animal power with mechanical power for a long time to come. Under the new situation in the rural areas, we should continue to eliminate "leftist" ideology, earnestly give the peasants the right to choose for themselves in the matter of mechanization and let the commune and brigade collectives and individual peasants and combined households have a real choice in order to achieve the selective development of mechanization. The basic-level cadres in the rural areas should not monopolize everything. At the same time, the industrial department of agricultural machinery should make a thorough investigation and study of the rural markets and produce the agricultural machinery that the peasants need. Agricultural machinery management departments should revise, according to the new situation in the rural areas, the district division of the mechanization of agriculture and study again and work out a plan concerning the execution of mechanization in different areas. They should give good advice to the peasants on the matter of selecting machinery and do demonstrations, popularizations and the job of transferring technical knowledge well so as to attract the peasants and help them make a good selection of agricultural machinery. We believe that selective development of agricultural mechanization should include the selection of machines, work projects, management patterns and priority areas of mechanization, etc. No matter which machines are selected, the economic result should be put in the first place. This is our final goal in helping the peasants select mechanization. Practically speaking, the things to be selected include the following:

1. Selection of machines. Viewed from the fact that ever since the introduction of the responsibility system in the rural areas, the management scale has become very small and land more scattered, what the peasants will demand in agricultural machinery are small-size, multiple-purpose, high-quality and low-price agricultural machinery products. These should be products with finalized designs whose economy, adaptability and dependability have been appraised and assessed. Those which have not been appraised and assessed should not be put on the market.

2. Selection of work projects. In accordance with local peasants' demand, projects which are most urgently needed for agricultural production, which have increased most in production and which are the most labor saving should be started earliest. Generally speaking, projects which are urgently needed for local production, which are technically practicable, which need less investment, which take less time to return the investment and which are economically worthwhile should be mechanized earlier. Presently, the processing of agricultural and sideline products, irrigation and drainage, plant protection, shelling, transportation, cultivation in the north and rotary cultivation in the south are among the agricultural work projects which are more commonly mechanized and have taken root among the peasant masses.

However, there are still quite a few advanced agricultural machinery work projects which are not extensively popularized. Therefore, at the same time as mechanization work projects are selected, a lot has to be done on their introduction, demonstration and popularization. For example, film-laying machinery, which has been popularized in Xinjiang, Liaoning, Shanxi and Beijing, not only presses firmly and is advantageous to moisture conservation and wind resistant, but also increases the work efficiency scores of times. The work efficiency of a large- or medium-size towed or drawn film-laying machinery is 50-60 times as much as that done by hand, and the work efficiency of a manually towed or drawn film-laying machinery is about 25 times as much as that done by hand. Besides, the machinery uses 1-1.5 kg less film per mu than that done manually. The production of ginned cotton can usually increase by 30-60 jin per mu, peanuts by 150-200 jin per mu and vegetables by over 100 yuan per mu. Compared to seeding by hand or by an animal-powered seeder, a precision seeder not only can achieve better spacing between lines and rows, even depth and meticulous and careful cultivation and bring into play the function of increased production by rational close planting but can also conserve a lot of seeds. According to experiments done in Shunyi Prefecture, Beijing, the amount of corn seeds used per mu decreased from 10 jin in the past to 2 jin when using a precision seeder to plant corn, for a saving of 80 percent of the seeds. The use of machinery to apply chemical fertilizer deeply not only saves labor but also increases the fertilizer efficiency by a large scale. Experiments prove that when using machinery to apply fertilizer from 6-10 mm deeper, the loss of ammonium carbonate through volatilization decreases by more than 90 percent. When applying fertilizer deeply in a paddy field, it cannot only avoid the loss caused by denitrification but also decrease the consumption of fertilizer by weeds. Moreover, rice seedling raising machines, the vegetable-sprinkling irrigation techniques and tea tree trimming machines, etc., all have good economic results.



3. The selection of areas. On selecting areas for mechanization, stress should be placed, in accordance with the division for agricultural mechanization, on commodity grain bases and on metropolitan suburban areas, where there are few people and plenty of space, where conditions are advantageous to mechanization, where there is great production potential and where there are high economic results. Taking the entire nation into account, we believe that the Northeastern Plain and the agricultural areas in northern Xinjiang should be stressed as the areas to be mechanized. The amount of agricultural machinery equipment in the current metropolitan suburban areas is relatively higher. Therefore, besides filling up the gap in equipment, we should bring into full play the function of the available agricultural machines. Agricultural machinery should definitely be put on the Huanghai and Huaihai Plains. In the commodity grain bases in the south, mechanization should be treated as one of the important agricultural basic constructions. Those prairie pastoral areas whose conditions are better should quicken the development of the mechanization of animal husbandry. Besides, the mechanization of forestry, of fishery and of tropical crops areas should also be developed selectively.

### III.

Currently, the contract responsibility system linking remuneration to output has been commonly practiced in rural areas. In order to do the selective development of agricultural mechanization well under this situation, stress should be placed on solving the three following problems:

1. Further adjust and reorganize the agricultural machinery industry. The agricultural machinery industry is the equipment department for the selective development of agricultural mechanization. In our nation's agricultural machinery industry there has existed for a long time the problems of dispersion, disorder, low quality and high cost, etc., to which good solutions have not been found. In recent years, due to the thorough execution of the policy of readjustment, restructuring, consolidation and improvement and reorganization carried out in accordance with the specialized coordination principle, quite a few results have been achieved. However, the problems of dispersion, small batches, mixed models, low quality and high cost, etc., are still not completely solved. Moreover, problems of emphasizing main engines and neglecting auxiliaries still exist in production. Therefore, further readjustment and reorganization of the agricultural machinery industry should be done well, and an investigation and study of rural areas should be done thoroughly so as to produce whatever the peasants need. Thus, it will be possible to provide the high-quality and low-price agricultural machinery which the peasants select.

2. Restructure the agricultural machinery management system. Currently, two major transformations are underway in the people's communes in rural areas. One is the introduction of the contract responsibility system linking remuneration to output; the other is the separation of government and communes. In addition, after the thorough execution of the party Central Committee's 1983 Document No 1 in the rural areas, a strong trend toward peasant and combined households purchases of agricultural machinery such as tractors appeared. According to incomplete statistical information, the tractors managed by

individuals in the entire nation (including those owned collectively by communes and brigades and contracted to individuals) already make up almost two-thirds of the total agricultural machinery owned by the nation. The agricultural machinery management system we had in the past no longer fits the new situation. It needs to be restructured. We believe that the current agricultural machinery work not only has to be geared to the commune and brigade collectives but, more importantly, has to be geared to the hundreds of thousands of households. We should change the track of first-level agricultural machinery management to a stress on technical service and conscientiously do a good job on technical services such as technical training, the supply of fittings, and maintenance and repair, etc. The agricultural machinery management organization at the provincial, city and autonomous region level should be placed under the leadership of the peasants. The agricultural machinery supply and marketing department should not be put together with manufacturing departments and should not make the production, supply and marketing a coordinated process, thereby preventing the agricultural machinery product areas from being blocked. However, the agricultural machinery supply and marketing departments should be joined with the agricultural machinery management and repair departments. It is better to make management, supply and marketing a coordinated process. Thus, the agricultural machinery supply and marketing departments not only can speak for the peasant consumers but can also make the manufacturing departments arrange their production in accordance with the demand arising from the peasants' own choices.

3. Strengthen the scientific study of agricultural mechanization and provide the peasants with scientific bases in their selection of mechanization. The crucial point for doing the selective development of agricultural mechanization well lies in whether the machinery selected matches local natural and economic conditions as well as the agronomic demands and whether it can improve economic results. Objective and accurate evaluations can be achieved only through the scientific study of agricultural mechanization. For this reason, based on research and studies, we should make careful technological and economic analyses of the machinery, work projects and areas to be selected, and, based on comprehensive analyses, restudy and draw up a plan for mechanization in different areas.

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## AGRICULTURAL PRODUCT PROCUREMENT CONDITIONS OUTLINED

Beijing NONGYE JISHU JINGJI [ECONOMICS FOR AGRICULTURAL PRODUCTION TECHNOLOGY] in Chinese No 7, Jul 83 pp 25-28

[Article by Duan Yingbi [3008 2019 4310]: "Some Situations in and Opinions on Farm Product Procurement"]

[Text] An important condition for promoting agricultural development is to do the agricultural product procurement well. Currently, in order to make another breakthrough in agricultural development, we must look into procurement problems so as to make the necessary adjustment to related policies in accordance with the changes in objective situations. The following is my personal point of view.

### The Evolution of Procurement Policies

The procurement policies of agricultural products have undergone many changes in the more than 30 years since national liberation. The situation is roughly as follows:

Before 1953, the trade in agricultural products was basically free trade. At that time, the state controlled agricultural products by entrusting the supply and marketing cooperatives in the rural areas with direct purchasing from the peasants as the main way, while state-run businesses also purchased directly from the markets. In addition, the state directly controlled some of the agricultural products (mainly grain) by levying agricultural taxes in kind. According to the statistics of 1953, of the total social agricultural and sideline products procured, 67 percent were procured by state-run businesses and supply and marketing cooperatives, and 26 percent by private-run businesses.

From October 1953, the state started to carry out the planned procurement and planned selling of grain, i.e., "centralized procurement and centralized selling," the specific content of which was the practice of planned procurement of the peasants' surplus grain; the practice of planned supply to the people in the cities and to grain-deficient peasants; a ban on grain businessmen; and under the party Central Committee's centralized administration, the sharing by central and local organizations of the responsibilities of running the grain business. In the past 30 years, although the concrete policies and methods of grain procurement and sales were frequently adjusted, the centralized procurement and selling system has never been changed.

After grain, the centralized and assigned procurement method was adopted in other important agricultural and sideline products. In November 1953, it was adopted in the procurement of oil-bearing crops; in July 1954, cotton; and in January 1955, live pigs. In October 1956, it was also adopted in the procurement of more than 10 agricultural products such as flue-cured tobacco and tea; in 1957, export fruit and 30 kinds of Chinese medicinal materials were also included. From 1961, the state divided the agricultural and sideline products into three categories and practiced centralized procurement for the first category of products, assigned procurement for the second category and negotiated procurement for the third category. According to regulations, the first category of products was managed by the state and was not to be sold on the market, while the second category could be sold on the market after fulfilling the assigned procurement. However, in the execution of this policy, cotton was the only product whose sale on the market was never allowed, and grain and oil were allowed now and then, while many of the second-category and even third-category products were often not allowed to be sold on the market. In a word, there were no clear-cut lines drawn to distinguish the centralized, assigned and negotiated procurement methods.

There were over 20 kinds of products which were listed for centralized and assigned procurement at that time, and after gradual expansion there were over 230 kinds at the most. In 1980, an adjustment was made and 132 kinds of products were listed for procurement by the departments under the party Central Committee and the State Council. At present, centralized procurement and assigned procurement generally make up about 80-85 percent of the total procurement of the society's agricultural and sideline products.

Besides the administrative measures taken to expand the assignment indication of centralized and assigned procurement in order to encourage the peasants to sell more agricultural products to the state, some economic incentive methods were also adopted:

1. An increase in procurement prices. There were large-scale general adjustments, one of which was in 1961, when the price of grain was increased by 25 percent, oil-bearing crops by 13 percent, live pigs by 26 percent and fowl and eggs by 37 percent. The second one was in 1979, when the prices of 18 kinds of products were increased by an average of 24.8 percent. With the different adjustments made over the years, the procurement price level of agricultural and sideline products as a whole in 1981 increased 201.2 percent over 1980 [sic], 147.7 percent over 1952, 106 percent over 1957, 60 percent over 1965 and 44.3 percent over 1975.

2. The practice of an increased price for overprocurement. In 1961, the method of increasing the price for overprocurement was adopted in grain procurement but was canceled in half a year. From 1965, the grain procurement base was settled in the entire nation. For the portion over the procurement, half were awarded with materials, and half with 30 percent price increase. In 1971, adjustment was made to reduce the procurement base, and all the overprocured portions were awarded with 30 percent price increases. In 1979, the procurement base was further adjusted and reduced, and the award was increased to 50 percent. In recent years, the base assignment was reduced by nearly

10 billion jin in order to lighten the masses' burden. Procurement bases have also been set since 1979 for oil-bearing crops, cotton and some second-category products, and the method of increasing the price for over procurement was adopted.

3. The development of negotiated procurement. The development of negotiated procurement of the first- and second-category products also started with grain. In 1963, 3.1 billion jin of grain were procured through negotiated procurement, but over the years the procurement was decreased to less than 1 billion jin. From 1979, there was a great increase and the procurement reached more than 20 billion jin.

At present, of the agricultural and sideline products procured by state-run businesses and supply and marketing cooperatives, procurement at par makes up about 60 percent, overprocurement about 25 percent and negotiated procurement about 15 percent.

Furthermore, incentives for selling products in short supply were adopted in 1961 to encourage the peasants to sell their agricultural products to the state. However, this method was criticized as "materialistic stimulation" during the 10 years of turmoil and was commonly canceled. It was not until 1973 that it was resumed. Grain and chemical fertilizer were the main things used for incentives. In 1981, the state paid 18.4 billion jin of grain for incentives, 5.22 million tons of fertilizer for incentives, plus those given out locally. The total of grain incentives was more than 9.8 million tons.

#### The Main Problems Today

That it is completely necessary to practice centralized and assigned procurement in agricultural and sideline products is without doubt. In our country, we have a lot of people, little land and an agriculture which is not advanced. Agricultural products have always been in short supply. However, with a weak industrial base, the nation cannot get but a certain amount of accumulation from agriculture for national economic construction. Under these conditions, if centralized and assigned procurement is not adopted, the consequences will be disastrous. Yet, we should also see that the centralized and assigned procurement system in its nature means monopolization by the state, and when practiced too long, it will inevitably deviate from the laws of economies, and especially from the law of value, thereby resulting in some problems. The three current problems are:

1. Overcentralization. At present, there are as many as 132 kinds of products which are under the control of the departments of the party Central Committee's centralized and assigned procurement system, plus those added by different levels of local authorities. There are very few products left which are actually classified in the third category at the basic level. According to research done in a county of Hubei Province, out of the more than 300 kinds of products, there were only 3 kinds which were really classified in the third category. Of the total agricultural and sideline products procured in the entire nation, those sold directly by the peasants themselves to the city residents make up only 4-5 percent over the long term. Although there

has been a greater increase in recent years, the proportion is still less than 10 percent. For some products, especially grain, not only the commodity portion is procured, even the peasants' grain ration is procured too. From 1954-78, there was hardly a year when "excess grain" was not procured. Although the adjustment made in the past few years has improved the situation a lot, generally speaking, overcentralization still exists both in the kinds and quantities of products. Due to overcentralization, not only is the peasants' right of product management restricted, but the communication channels of products are also affected. As a result, in recent years whenever there is little development in the commodity production in the rural areas, the peasants have problems selling their agricultural and sideline products.

2. Low procurement prices. People all think differently about whether "price scissors" still exist in industrial and agricultural products and how wide the "price scissors" are. However, one positive thing is that when viewed from the angle of the peasants' income, the procurement prices of agricultural products are on the low side, especially before the 3d Plenary Session of the 11th Party Central Committee. First of all, the increase in prices could not catch up with that of costs. Compared to 1957, the procurement price per 100 jin of paddy rice in 1978 increased by 5.5 yuan, and the cost by 7.78 yuan; the procurement price for wheat increased by 5.87 yuan, the cost by 10.7 yuan; the procurement price for millet increased by 4.66 yuan, the cost by 7.3 yuan; the procurement price for corn increased by 4.8 yuan, the cost by 7.60 yuan; the procurement price for gaoliang increased by 4.79 yuan, the cost by 9.42 yuan; and the procurement price for soybeans increased by 13.1 yuan, and the cost by 18.23 yuan. Second, there was no profit or very little profit in agriculture. In 1978, the average net income after taxes per mu for grain was 1.63 yuan, oil-bearing crops 0.1 yuan and industrial crops (four kinds) 27.46 yuan. Third, peasants earned very little cash income selling their agricultural and sideline products. In 1978, the procurement total of social agricultural and sideline products in the entire nation was 55.8 billion yuan, an average of 68.76 yuan per peasant. In other words, after deducting the part kept for personal needs, a peasant could get only 68.76 yuan cash income for the agricultural and sideline products he produced in a whole year. It was very obvious that this was not enough for him to buy production materials, manufactured goods for daily use and other necessities. Therefore, the peasants could only depend on an industrial sideline occupation to make up for it. In fact, the "use industry to make up for agriculture" slogan reflects in itself the fact that the prices of agricultural products are on the low side. In the last few years, with the increases in prices and output, and decreases in costs, the situation has improved a little. In 1981, the average net income after taxes reached 11.16 yuan per mu for grain, 22.68 yuan for oil-bearing crops and an average of 67.09 yuan for eight kinds of industrial crops. In 1982, the average cash income of a peasant selling agricultural and sideline products reached 135.36 yuan. This showed that agriculture has begun to be profitable. Yet, generally speaking, the procurement prices for agricultural products are still on the low side. Although it is true that when viewed from the state's financial capacity, the general price level of agricultural products cannot have any more large-scale increases, this fact is not to be used to deny that the prices are too low.

3. Inverted purchasing and selling prices. Presently, the state loses money in doing grain, cotton, oil, meat, fowl and vegetable businesses. In the case of cotton, after the procurement price was increased, the transfer price that the supply and marketing cooperatives charged the factories remained unchanged, thereby resulting in deficits to businesses and profits to industries. In the general account, the state still made money. In nonstaple foods such as meat, fowl, eggs, vegetables, etc., the prices between purchasing and selling were balanced. However, the state had to make up for losses which occurred in the course of management. As for grain and oil, the purchasing and selling prices were inverted. Take grain, for example. The current centralized procurement price is 26 percent lower than that of the selling price. However, after adding up the increased prices for overprocurement and circulation costs, the selling price is 76 percent lower than the purchasing price, which is roughly a deficit of 10 cents for each jin of grain. The inverted purchasing and selling prices have resulted in a lot of problems. In the first place, it increases the state's financial subsidy. In 1981, the subsidy for grain alone reached 12,789,000,000 yuan. If no measures are taken, the subsidy will increase year after year, which will be very unfavorable to the state's balance of revenue and expenditure. Second, it causes problems to the state's balance of grain income and expenses. Currently, due to the inverted prices, city residents are very careless about the conservation of grain, and industrial enterprises which use grain as materials are not willing to use substitutes. In addition, the noncommodity grain population is trying very hard to sell its grain as commodities; as a result, the prices of grain in the cities cannot be lowered. In rural areas, many people who are not deficient in grain still ask the state to sell grain back to them, and then, at increased or negotiated prices, they sell the grain which they have purchased from the state at par back to the state. In fact, almost half of the grain incentives in some cotton and sugar production centers has not been bought back. For this reason, the sales condition in rural areas is also out of control. In order to fulfill the inflexible procurement task, the state cannot but pay high prices to buy more grain. As a result, the following condition appears: while the income and expenses of grain as a whole (including imported grain) are balanced, the gap between that of centralized procurement and selling is getting wider and wider. The state cannot help but sell the grain which it has bought through negotiated procurement at par, thereby increasing its financial burden.

There is also the multiple-price problem in the procurement of agricultural products. Again, take grain for an example. There are centralized procurement prices, overprocurement prices and negotiated prices. In some places, there are also all kinds of selling incentives and subsidies. When viewed from the angle of encouraging the peasants to sell more products, this kind of multiple-price system is advantageous. However, there are also disadvantageous influences. The first is the unevenness in benefits and hardships. Places which have large bases are in an unfavorable situation. The second is the difficulty in fulfilling the task of establishing parity. As a result, there are unfulfilled base quotas every year. The third is caused by the inconsistency between price index and actual conditions, which makes price control, especially the fixing of rational comparison prices, very difficult.

The fourth is that the complication of procedures increases the procurement and accounting work load and results in delayed procurement, forcing the peasants to wait in long lines. The fifth is that economic criminals are given a chance to act. Some grain-managing units count the grain they have bought at par as overprocured or procured through negotiation, and thus by changing the accounts, they make a lot of money. Getting rid of these corrupt practices is also a problem which needs immediate solution.

#### A Few Suggestions for the Current Adjustments to Procurement and Selling Policies

The centralized and assigned procurement system of agricultural products, a product of certain historical conditions, will also change along with the changes in objective conditions. To regularize this system and even draw an equal sign between it and socialism, thinking that this is socialism and refusing to think about restructuring, is not right. Neither is it a practical idea to try to cancel the centralized and assigned procurement system before conditions have matured. In seeing the necessity of the centralized and assigned procurement system and its malpractices, our present task is to insist on it while making necessary adjustments to specific policies and measures.

1. Reduce the scope of centralized and assigned procurement. Some of the products in the procurement plan, such as yellow-flowered *Auricularia auricula-judae*, have not much to do with the national economy or the people's livelihood. Some are important, but supply and demand have roughly balanced, and the problem is not that the peasants are unwilling to sell the products but that the state limits procurement. These are the products which can be excluded from the scope of procurement right away. For products which really need to be procured, rational procurement bases should be defined to stabilize the task and change the practice of total procurement employed in the past so as to enable the peasants to get more rights to manage their products through increasing production. On the matter of solving the imbalance in grain income and expenses, we should not take the road of increasing the task of centralized procurement but rather solve it through decreasing centralized selling and increasing negotiated selling. For portions beyond the centralized procurement assignment, multichanneled management and a rise and fall in prices should be allowed. These methods, to put it briefly, are to eliminate the regulation of plan properly while increasing that of the market. In order to make it safe, we should have a general proportion, to begin with. Of the procurement of agricultural and sideline products, the planned regulation portion makes up about 80 percent, which, according to the current level of productive forces and the demand and supply condition in the market, can be decreased to 60-70 percent. It might be more appropriate and more advantageous to let go of the other 30-40 percent.

2. Simplify the procurement price system. In order to overcome the problems resulted from multiple prices, it is necessary for us to simplify the procurement price system and use different methods for different products. On the whole, the "base method" which is used in industrial crops such as cotton, oil, sugar, etc. can be changed to one whose prices increase according to a



fixed proportion (namely, the "proportional method") similar to what has been employed in rapeseed. What this method does is to make some adjustments of profits among areas and peasants that grow those crops. It changes neither the price parities between industrial and agricultural products nor those among different crops. For the price of grain, a method which gradually increases procurement prices to the overprocurement level can be adopted because the current procurement price of grain, compared to that of industrial crops, is on the low side and has to be properly increased. However, if the "proportional method" is adopted, it will undoubtedly affect the income of areas with low bases. These are also the areas which are the focal points in our country's grain development. Through this kind of adjustment, there will be only one price for each product within the procurement assignment. Beyond the assignment, market prices will be used. Although there are still two sets of prices, they are a lot simpler than what we have now.

3. Stabilize financial subsidies. Due to its natural and economic characteristics, agriculture is a department which costs more money. In addition, since it is a basic department which no other departments can do without, financial supports which include price subsidies are indispensable. Most countries throughout the world have price subsidies for agricultural products, although the subsidy methods are not all the same. It is necessary for us to subsidize agricultural products now. The question is how it should be tailored to the state's financial condition. Currently, we have to stabilize the amount of subsidies and keep it from increasing rapidly year after year. The various kinds of agriculture-related subsidies the state has been paying for make up one-third of its revenues. If the subsidies keep on increasing, it will certainly increase the state's financial burden and affect the entire nation's economic construction. A better way to solve this problem is to increase the prices of agricultural products to the level of the procurement price plus circulation fee and change the current price subsidies into direct investments in production. However, this cannot be achieved for a while. To stabilize the current price subsidies, two aspects should be stressed: one is to stabilize the general price level of agricultural and sideline products. For agricultural products which do not have rational internal parity prices, adjustment can be made only on condition that the general price level is kept stable. Another is to stabilize the centralized selling level of products such as grain whose prices are inverted and properly change part of the centralized selling into negotiated selling. In addition, work should be done to eliminate the managerial links and increase business equipment, thereby cutting down subsidies for management losses. Currently, subsidies for the management losses of grain, oil and pigs alone are almost 4 billion yuan. The potential in this area is remarkable.

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## QUESTIONS ON CITIES, TOWNS STUDIED

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[Article by Zhang Wudong [1728 0523 2767] of the East China Normal College Geography Department: "Several Questions Concerning Cities and Towns"]

[Text] Since World War II, urbanization in the world progressed very rapidly. Many branches of sciences have attached importance to the study of cities and towns. Geography is one of the major branches. Using the theories and methods of geography, primarily urban geography, to study and resolve urban issues, primarily the issue of urban planning, is now in the ascendant. In order to adapt to the need of the teaching of geography in secondary education, we are giving the following brief introduction to the four issues of the concept, nature, scale and distribution of cities and towns. (Please refer to Issue No 1 of the 1983 Volume of this journal concerning the issue of urbanization.)

### I. The Concept and Criteria of Cities and Towns

Cities and towns are located at regional centers and areas of population concentration, and are residential areas (communities) where there are primarily nonagricultural production activities and some nonproduction activities (administrative, military and cultural).

The distinction between urban and rural residential areas is very obvious. But the criteria for urban demarcation are different for different countries. In the 193 countries and regions in the world, two-fifths of the countries and regions only publish the names and number of their cities and do not have specific criteria for them. About one-fifth of the countries and regions use capitals and administrative centers as the criteria for urban demarcation. These are mainly the very small countries and regions, such as the four small countries in Europe. The larger countries are Egypt, Algeria, Syria and Brazil. The remaining two-fifths of the countries and regions use population as the criterion. But even then, they have very different lower limits. Some countries and regions also have additional factors. Of the countries and regions that use population as the main criterion for urban demarcation, 13 have set 100 to 1,000 people as the lower limit of population. These are mainly countries that are very cold and sparsely populated or are developing relatively late, the former ones being

Iceland and Greenland and the latter ones being Canada and Australia. There are 39 countries with the lower limit of population being 1,400 to 3,000 people. These include China, Japan, the United States, and the Soviet Union. There are 12 countries with the lower limit of population being 5,000 to 20,000 people. These are mainly those countries with dense population, such as the south Asian countries, namely, India, Pakistan and Bangladesh, the southern European countries, namely Spain, Portugal and Italy, and the east African countries, namely the Sudan, Somalia and Malagasy. The additional factors are: the proportion of nonagricultural population, population density, characteristics of the residential areas and construction density. Most of them have fixed a proportion for nonagricultural population. For instance, the Soviet Union fixes the proportion to be 50 to 85 percent or more (the various republics in the union have different proportions), and Yugoslavia fixes the proportion to be 30 to 80 percent or more (which is fixed according to the scale of the population in the towns).

To make it convenient for comparative studies by the various countries, the International Statistics Association proposes that the lowest criterion of population of a "town" be 2,000 people.

The upper limit of the population of a "town" also crosses over the lower limit of the population of a "city." Here, the various countries differ. For the Soviet Union, Finland and Australia, it is 20,000 people; for Japan, it is 30,000 people; for the Democratic People's Republic of Korea, it is 50,000 people; and for China, which has the highest criterion, it is 100,000 people. To make it convenient for comparative studies by the various countries, the U.N. regional development center stipulates that the lowest criterion of population for a "city" is 20,000 people.

The criterion for setting up our country's present "towns" was stipulated by the State Council in 1963. The "town" is an administrative unit that is under the leadership of the county. There is considerable concentration of industry, commerce and handicraft industry. There is a population of over 3,000 people, among which over 70 percent is nonagricultural population. Or, there is a population of over 2,500 but below 3,000 people, with 85 percent being nonagricultural population. The criterion for setting up towns can be appropriately lowered in the minority nationality or outlying regions. In 1980, there were 2,874 towns throughout the country.

The criterion for setting up our country's present "cities" was stipulated by the State Council in 1955. The "city" is an administrative unit that is under the leadership of the province, autonomous region or prefecture, autonomous zhou, or league (the cities that are directly under central jurisdiction are administrative units at the level of province and autonomous region). They have a population of over 100,000 people. If the population is under 100,000 people, then they must be important industrial or mining bases of a larger scale, the locations of provincial level state organs, areas where there is a higher concentration of materials or important cities and towns of the outlying regions. Also, cities can only be set up when they are definitely necessary.

In 1980, our country had set up 223 cities. Among them, 3 are cities directly under the central jurisdiction, 106 cities that are directly under the provinces and autonomous regions and 114 cities that are under the jurisdiction of the prefectures, autonomous zhous and leagues. Of these cities, 41 do not have a population of 100,000 people, and 6 of these 41 cities, namely Zhuhai, Enshi, Weihai, Yima, Suifentong and Erlianhaote, do not even have 50,000 people. But these cities are set up because they are definitely necessary.

With the changes in political and economic situations, the various countries and regions are constantly readjusting the criteria for setting up cities and towns as well as the systems of management. Our country is no exception. With the development of the four modernizations, the quantity of our country's cities and towns will inevitably increase.

## II. The Character and Classification of Cities and Towns

The character of cities and towns refers to the position and primary roles of a city or town in the political, economic and cultural aspects of a country and region. It differs from the other functional characteristics of cities and towns. It embodies great significance in determining the composition of city population, the structure of the national economy, the composition of land use, planning and the projects and criteria for municipal facilities.

A very important issue is how to scientifically determine the character of cities and towns. If we do not have a complete set of theories and methods for determining the character of cities and towns, then we will not have a clear understanding of the character of cities and towns, and thus will often fail to have a good grasp of the major contradictions of the nature of development of cities and towns. We will then enumerate many conventions or vacillate among the many programs based on the superficial phenomenon of a city or town. Consequently, we will lead the city to develop blindly. This not only is unfavorable to the building and development of the city or town itself through giving play to its superiority and avoiding its weaknesses, but makes it impossible for the city or town to bring its role effectively into play in a country or region, thereby disrupting the rational economic structure of a region and the necessary division of labor and alliance of cities and towns, and harming economic and social results.

To determine the character of cities and towns, we should proceed from an analysis of the functions of cities and towns. The primary function of cities and towns is the character of cities and towns.

The functions of cities and towns refer to the tasks the cities and towns shoulder and the roles they play in the political, economic and cultural lives of a country or region. The functions of a city and town are often diversified, involving such aspects as politics, industry, communications, commerce and trade, culture, education, science and technology [S&T], military affairs, religion, rehabilitation and tourism. There are very very few cities that only have one function. Generally, one or two functions occupy the obvious positions of superiority among the variety of functions, which are,

therefore, secondary functions. For instance, the primary function of Maoming City in our country's Guangdong Province is the petroleum industry, and the primary function of Anshan City in Liaoning Province is the steel industry. We must pay attention to analyzing and studying those cities and towns that have many functions but do not have one function that occupies an obvious position of superiority, and find out what their relative primary functions are.

As is the case in all other matters, cities and towns embody general and specific characters. In describing their character, some cities and towns today often use such terms as socialist, productive, modern. In fact, these are the general characters of our country's cities and towns and cannot represent the character of the cities and towns. Only the specific characters in the functions of cities and towns can embody the unique character of each city and town and reflect its basic attributes that distinguish it from other cities and towns. These specific characters are formed from the long-term development of the cities and towns under different natural, historical, economic and geographic conditions. Only those departments which produce relatively great influence on and play important roles in the region outside their cities and towns, that is, those basic departments which embody decisive influence on the formation and development of cities and towns, can embody the character of cities and towns.

With the changes in conditions and the needs of objective reality, the character of cities and towns can also be readjusted. Thus, a complete concept of the character of cities and towns should be summarized as follows: The character of cities and towns means the primary function of cities and towns, and refers to the major tasks shouldered by cities and towns, the major roles they play and their direction of development in the political, economic and cultural lives of a country or region.

But this does not mean that there will be as many different characters of cities and towns as the number of cities and towns in the world. This is not only impossible but unnecessary. In theory and in practice, it is of major significance to classify cities and towns.

Since the 1920's, the circles of geography, economics and sociology abroad have carried out much research on the topic of the classification of cities and towns. There is a wealth of concerned documents and the methodology of classification is improving continuously. Currently, the overall situation of this research is as follows: Classified description has changed from qualitative analysis. Quantitative analysis is progressing from utilizing one set of data to selecting multiple factors in combination with the analysis of variables, and is beginning to use computers to handle the massive quantity of materials. There are over 20 methods of classification, including general descriptions, statistical descriptions, statistical analysis, study of economic foundations and analysis of variables. Up till now, because of the different situations in the various countries, the amount and meaning of statistical data are different. Thus, we still do not have the methods and classifications which are generally acknowledged and adopted.

According to the above-described methods of classification, there are generally 6 to 8 major categories of cities and towns and 20 to 30 subcategories, involving nothing more than politics, industry (heavy industry, light industry, mining, processing industry, diversified industry and single-product industry), communications (harbors, railroad centers), commerce and trade, culture and education, S&T (university science, technology), military affairs, religion, rehabilitation and tourism.

Our country's study in urban classification at present is still not vigorously launched, and we still do not have a unified system of classification. Generally, we have 4 major categories and 13 subcategories:

1. Comprehensive cities and towns

- (1) Comprehensive large cities--such as Shanghai, Tianjin and Chengdu.
- (2) Key cities of provinces and regions--such as Yinchuan, Lhasa, and Jinhua.
- (3) County towns--including county seats and towns under county jurisdiction.

2. Industrial cities and towns

- (1) Cities and towns of diversified industry--such as Changzhou and Xuzhou.
- (2) Cities and towns of heavy industry--such as Fushun and Tangshan.
- (3) Cities and towns of light industry--such as Nantong and Jingdezhen.
- (4) Cities and towns of single-product industry--such as Yumen and Yichun.

3. Cities and towns of communications

- (1) Cities and towns that are railroad centers--such as Baoji and Yingtan.
- (2) Cities and towns that are harbors--such as Qinhuangdao, Zhanjiang and Yuqikou.

4. Cities and towns with special functions

- (1) Revolutionary memorial spots--such as Yan'an and Ruijin.
- (2) Scenic tourist cities and towns--such as Beidaihe and Zhaoqing.
- (3) Border defense cities and towns--such as Yining and Manzhouli.
- (4) Cities and towns belonging to the special zones--such as Zhuhai and Shenzhen.

The above classification of our country's cities and towns consists primarily of general descriptions, supplemented by statistical descriptions. Thus, the system of classification can only reflect the status quo in a crisscross

fashion. For instance, Suzhou presently is classified as a scenic city. But it is also an important industrial city and the key city of a region. In people's mind, Xuzhou should be a city that is a railroad center. Yet, its communications function is far less important than its industrial function. Furthermore, it is also the key city of a region. Some cities can be put in one category as well as another. Dalian can be categorized as an industrial city as well as a harbor.

### III. The Scale and Classification of Cities and Towns

The scale of cities and towns primarily refers to the scale of population of the cities and towns. It is the basis on which we draw up plans for various construction projects in the cities and towns. It affects a series of issues, including how much land we use in the cities and towns, how tall buildings should be and their proportions, the composition and quantity of facilities serving livelihood, the choice of transportation and the criteria for roads, the composition and criteria for municipal facilities as well as the size of the suburbs and the layout of cities and towns. Thus, the overestimation or underestimation of the scale of cities and towns can unfavorably influence the development of cities and towns.

The classification of the scale of cities and towns is very different for different countries in the world. Generally speaking, the countries that have a higher population density have a higher criterion. For instance, China only considers cities over 500,000 people as large cities. In contrast, the Soviet Union, Yugoslavia and Romania have a lower criterion, and regard cities over 100,000 people as large cities. The U.N. regional development center stipulates that cities having more than 100,000 people are large cities, cities with 50,000 to 100,000 people are medium cities, and cities with 20,000 to 50,000 people are small cities.

The scale of cities and towns is determined by the character as well as historical, social, natural, economic and geographic factors of cities and towns. Since the birth of cities and towns, there have been many scholars who have studied the question of rational scale for cities and towns. But opinions differ as to how large a scale is considered rational. Professor J.E. Gibson, the U.S. system engineering specialist, has rather systematically analyzed the strong points and weaknesses of cities and towns of different scales. He inherits the thinking of the ancient classical philosophers concerning the "ideal city" and the "natural scale" and holds that 30,000 to 50,000 people fits "man's measurement" more, and has a more satisfactory living environment. However, the economic results of such a city are relatively poor. When the scale of a city expands to 250,000 people, there will be more employment opportunities, more effective and better education, culture and medical care and the economic results will be raised. However, when the scale of a city expands to 1 million or more, the weaknesses will become more and more obvious, which will frequently lead to housing shortage, traffic congestion, environmental pollution, serious unemployment and increased crimes. Gibson's conclusion is: The scope of a rational scale of an independent new city is 800,000 to 1.2 million people.

Many scholars of city planning, civil engineering, geography and sociology in England, Japan, the Soviet Union, France and Germany are inclined toward the view that a medium city within the scope of 150,000 to 400,000 people is more rational since the economic results and social results are both better. Since World War II, the criterion for the scale of the new cities rose gradually from 20,000 to 50,000 people to 200,000 to 250,000 people. This practical experience also proves the above point. But there are also a few scholars who vigorously prove the superiority of large cities economically and do not attach enough importance to the social problems that appear in the large cities and that are extremely difficult to resolve.

Our country also has many opinions regarding the issue of the rational development of large, medium and small cities. Since the nation's founding, although we embraced the principles of "strictly controlling large cities" and "actively developing small cities," we still failed to control the large cities and failed to develop the small cities. Summing up our previous experiences and lessons, we stipulated the principle of "controlling the scale of large cities, rationally developing medium cities and actively building small cities" at the national work conference on urban planning that was held in the winter of 1980.

In 1980, our country had 15 exceptionally large cities (over 1 million people) and 30 large cities (over 500,000 people). They occupied decisive positions in the cities throughout the country. The value of their industrial output constituted 71 percent and the profit in taxes which they turned over to the state constituted 74 percent of that of the whole country. Building factories in large cities required little investment and attained fast and high results. However, the social results of the large cities were poorer, often having environmental pollution, housing shortage and traffic congestion. Controlling the scale of large cities is primarily controlling the scale of population and land use of the large cities, in particular controlling the scale of development of the exceptionally large cities that have a population of over 1 million people. But "controlling" is not equivalent to "not developing." Rather, it means taking the road of intensive development. For instance, Shanghai must develop in the direction of high-grade, precise and advanced production, develop toward the suburbs and develop toward the areas around it.

Our country has 70 medium cities (over 200,000 people). They are generally the centers of development for provinces, autonomous regions or special districts. They are distributed in a rather balanced manner in the midst of the various provinces, regions and large cities throughout the country, and are thus the intermediate links of our country's urban system, forming connecting links between the preceding and the following. The economic results of the medium cities are far superior to the small cities and are by no means inferior to the large cities. Statistics of 1980 show that the value of industrial output and profit provided by 100 yuan of original value of fixed assets was higher than the large cities that had a population of 500,000 to 2 million people. Some "satellite cities" (such as Nantong and Changzhou) have scored even better economic results.



Although the problems that exist in large cities also exist in the medium cities, they are not as serious and are resolved more easily (for instance, in 1982, there were 28 cities that did not have unemployed young people, and 17 of these cities were medium cities). Furthermore, the level of the standard of living is higher than that of the small cities. Thus, the medium cities are more attractive.

Most of the existing medium cities in our country still have the potential for development and should develop rationally. Some regional economic centers that have better conditions and some industrial and mining cities that have more abundant natural resources can be developed on a larger scale. Under the guidance of the principle of gradually realizing the rational planning of production throughout the country, another important path to take is to select the superior conditions, make use of the present small cities and towns and rationally develop them into medium cities in the hinterland where the natural resources are abundant and the economy is rather backward, in the outlying regions and in the suburbs or areas around the large cities, particularly the exceptionally large cities.

The small cities (towns) (under 200,000 people) are the centers of definite regional limits. They are close to nature, are close to the rural areas and have a better living environment. The problem of land use can be solved more easily and pollution can thin out easily. It is convenient for workers to go to and get home from work. Expenses in public transportation and gasoline are cut down. The investment in municipal construction projects only constitutes 2 to 3 percent of the investment in capital construction. In contrast, because of the huge needs and the higher demand for facilities, the large cities require 5 to 6 percent, while the exceptionally large cities require more than 7 percent of the investment in capital construction. Analyzing from the production point of view, the results of some "satellite cities" are better than those of the large and medium cities. For instance, the per capita value of output of industrial workers in Jingmen and Shashi is 91 and 78 percent higher than that of Wuhan respectively.

Strengthening the development of small cities (towns) has great significance. We can rationally distribute our country's industrial productive forces, can lighten the burden of the large and medium cities, and can use the small cities as the bases for advancing toward changing our country's rural outlook.

In 1980, our country had 108 small cities and 2,843 towns (including 1,600 town seats and 1,200 towns under county jurisdiction). In order to strengthen the construction of small cities (towns), from now on, we should adopt appropriate policies involving wages, labor welfare, medical facilities, schooling for children and employment, so as to encourage people to go to the small cities (towns).

We should point out that cities of different scales have their own strong points and weaknesses that cannot be confirmed totally or negated totally. In a country and region, due to different conditions, the existence of cities and towns of different scales is in accordance with the objective laws.

In terms of specific cities and towns, if we can attain the goal of "combining industry and agriculture, combining cities and rural areas, favoring production and offering living convenience," in other words, if we can unify economic results with social results, then the scale of that city should be considered rational.

#### IV. The Distribution of Cities

In 1975, there were 1,969 cities in the world that had a population of over 100,000 people; 393 of them in East Asia (including Japan), 291 of them in South Asia, 655 of them in Europe (including the Soviet Union), 217 of them in Africa (including Southwestern Asia), 194 of them in North America, 202 of them in Latin America and 17 of them in Oceania. There were 181 large cities with a population of over 1 million people. By 1981, there were 197 of them. The details of the distribution of these cities can be found in Issue No 12 of GEOGRAPHICAL KNOWLEDGE of 1982.

Prior to Liberation, the distribution of our country's cities and towns was extremely unbalanced. After Liberation, great changes have taken place in the distribution of our country's cities and towns. Many medium and small cities and towns have appeared in the broad southwest and northwest regions. The scale of population of the existing cities and towns has grown rather rapidly. This has preliminarily changed the situation before Liberation when the cities and towns were concentrated along the coastal region in an abnormal manner. Compared to 1950, in 1980, the number of cities along the coastal region\* increased from 55 to 72. Its proportion to the number of cities and towns throughout the country dropped from 45.8 percent to 32.3 percent. The number of cities in the hinterland (in the central region) increased sharply from 55 to 124, and its proportion of the number throughout the country rose from 45.8 percent to 55.6 percent. The number of cities in the outlying regions increased from 10 to 27, and its proportion of the number throughout the country rose from 8.4 percent to 12.1 percent. The changes in the distribution of large and exceptionally large cities were even greater. In the early days after Liberation, of the 15 large cities throughout the country that had a population of over 500,000 people, 22 were in the coastal region, 20 were in the hinterland and 3 were in the outlying regions.

Our country's coastal region has superior natural conditions, large population, advanced industrial and agricultural production, convenient transportation and frequent external economic relations. Thus, many cities and towns are distributed densely in the coastal region, and their functions are complete and their scales are large. In particular, the three unbroken city chains

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\*The coastal region includes 11 provinces, municipalities and regions, namely, Liaoning, Beijing, Tianjin, Hebei, Shandong, Jaingsu, Shanghai, Zhejiang, Fujian, Guangdong and Guanxi. The outlying areas include six provinces and regions, namely, Inner Mongolia, Ningxia, Gansu, Qinghai, Xinjiang and Tibet. The Hinterlands includes the 12 provinces and regions between the above two.

--Shanghai-Ningbo-Hangzhou, Beijing-Tianjin-Tangshan, and Shenyang-Anshan-Fushun--have a high concentration of population and cities and towns, a large number of industrial enterprises, high output value, high economic results, convenient transportation, and occupy decisive positions in the whole country. The materials of 1980 show that these three regions only constituted 1.56 percent of the land surface throughout the country. Yet, they had 21 cities and over 100 organizational towns. The urban population was 29.57 million people, which was 29.7 percent of the total urban population in the country. The industrial enterprises constituted 22.1 percent of the enterprises throughout the country, and the output value constituted 44.4 percent. The other regions where cities and towns were more concentrated were the delta of the Zhu Jiang with Guangzhou as the center, the Shangdong-Jian region with Jinan and Qingdao as the centers, and the Eastern Fujian region with Fuzhou and Xiamen as the centers.

The central region has better natural conditions and relatively advanced industrial and agricultural production. But because of the varied topography, the communications network is scattered and the density of cities and towns is not as good as that of the coastal region. The cities and towns are primarily distributed along the main communications lines. In particular, most of the large and medium cities are concentrated along the Chang Jiang with Wuhan and Chongqing as the centers, along the Beijing-Guangzhou Railroad with Shijiazhuang, Zhengzhou, Wuhan and Changsha as the centers, the Gansu-Qinghai Railroad with Xian, Zhengzhou and Xuzhou as the centers, and the Chengdu-Chongqing Railroad with Chongqing and Chengdu as the centers. The distribution of the small cities and organizational towns is more widespread and balanced.

The outlying regions have poorer natural conditions where a considerable proportion of land is deserts and high and cold areas. They are primarily inhabited by our country's minority nationalities. Historically, the production level was quite low and the agricultural foundation was poor. Industrial production developed relatively rapidly after Liberation. There are few cities and towns which are of small scale, and are scattered like dots all over. The three large cities that have a population of over 500,000 people (Lanzhou, Baotou and Urumchi) are within 1,000 to 2,000 kilometers of one another. Tibet is the region in our country where the development of cities and towns is the weakest and where the distribution of cities and towns is the thinnest. The region occupies 1.22 million sq Km, constituting 12.8 percent of the land in the whole country. It has only 1 city (Lhasa, with a population of 95,000 people) and 9 towns. The population of the cities and towns constitutes 9.5 percent of the total population of the autonomous region, and constitutes a very small proportion, which is 0.13 percent, of the total population of cities and towns throughout the country.

Taiwan Province is our country's sacred territory. For the time being it is not united with the large family of the motherland. Its criteria for urban demarcation is not the same as that of the motherland. There are five relatively large cities in the entire province. The materials of 1976 show that Taipei City had 2.09 million people, Gaoxiong City had 1.02 million people, Taichung City had 560,000 people, Tainan City had 540,000 people and Jilong City had 340,000 people.

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STATUS OF LAKE FISHERY DEVELOPMENT REPORTED

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[Article by Chen Guanxun [7115 7070 7311] and Gu Liangwei [7357 5328 0251]:  
"A Study of Developmental Strategies for Lake Fishery Production in the Middle  
and Lower Reaches of the Chang Jiang"]

[Text] The study of developmental strategies for fishery production is a comprehensive problem requiring a multilevel, multidiscipline study of fishery's economic construction. We must clarify the internal relationships and external conditions of various important factors in the economic activities of fisheries by thoroughly investigating and studying the various aspects of fishery economics. We must get a good grasp on and utilize the objective laws of existence and create a set of methods combining theory and practice to guide our fishery and economic construction so as to give full play to the superiority of the socialist system.

In accordance with the present conditions of lake fishery and its position in fishery as a whole, we should give due attention to the following points when formulating a developmental strategy for lake fishery:

First, we must clarify and ascertain accurately the basic situation of lake fishery. A correct policy comes from the scientific analysis of the actual conditions. In formulating a developmental policy for lake fishery, we must clarify the particular features and present the conditions, problems, experience and lessons of lake fishery; we must clarify the beneficial conditions and disadvantageous factors for the development of fishery and the relationship of these conditions and factors with the surroundings and with social and economic developmental tendencies; and we must clarify the cultural level, age composition, technological capabilities and management standard of fishery workers, etc. Only with ample material can we create a fairly correct policy decision. Second, we must study the development of lake fishery from the economic and ecological viewpoint. The lake ecological system maintains its ecological balance through the material cycle and energy exchange by certain specific forms, and fishery production must fit the lake's ecology. When we study the developmental strategy for lake fishery, we must have both a production viewpoint and an ecological viewpoint. And this is precisely the ecological-economic viewpoint. Third, we must seize leadership of important

contradictions and classifications. The natural conditions, ecological factors, social structure, fish culture technology and management standards of lakes in the middle and lower reaches of the Chang Jiang are all different. Consequently, when we study the development strategy for each lake, we must begin with reality, distinguish different circumstances and different features and adopt different methods. Only then can we achieve results. To take China's five great lakes as an example, because the aquatic plant cover ratio for Tai Hu and Chao Hu is too low, the strategy influences the propagation of resources. Yet the two lakes are different. Vegetation and soil quality are fairly good on all four sides of Tai Hu, but those of Chao Hu are just the opposite. The water level of Hongze Hu is basically unstable, raising and falling suddenly. The lake dries up 1 year out of 3. This is very harmful to resources. Dongting Hu has a very extensive silt problem. On Poyang Hu harmful fishing equipment and fishing methods are used, critically injuring young fish resources, etc. By analyzing the principal contradictions of each lake and adopting proper methods for solution, we can raise the production potential of the lakes. Fourth, we must mobilize enthusiasm in every area through correct policies. At present, most small-scale lakes are already undergoing both fish culture and fishing and have achieved not inconsiderable beneficial experience. But development has been slow for large- and middle-size lakes because they have a large surface area, straddle [administrative] boundaries, have many villages along their shores and involve large areas and also because there is a lot of investment in them. Only when we coordinate relations between various quarters along the lake shore and balance benefits, can we reduce resistance and speed up development. We must also correct the lopsided viewpoint of only having independent family management and fully mobilize the enthusiasm of various quarters so as to enable individual, collective and national management to rise together. Fifth, we must improve the present economic structure of lake fishery. To set up a rational economic structure is to set up a structure that fits both natural and economic laws in order to facilitate mobilizing various factors in various fields, raise economic benefits and raise the commodity rate.

To sum up, the objective of our study is to seek the very finest developmental road for lake fishery in order to obtain the very best economic results.

#### 1. The Present Conditions of Lake Fishery in the Middle and Lower Reaches of the Chang Jiang

The Chang Jiang is China's longest river, about 5,800 km altogether. The river basin area is approximately 1.8 million square km which is about one-sixth of the total area of the nation. All of China's five famous freshwater lakes--Dongting Hu, Poyang Hu, Tai Hu, Hongze Hu and Chao Hu--are in this area. Because of its superior geographic position and temperate climate, lake fishery in the area has a large water surface area, many lakes, excellent natural conditions, abundant resources, relatively high fishing yields and other features. At the same time, it has the following beneficial conditions:

A. Lake management organs have been set up throughout the area. For example, 11 large- and middle-size lakes in Jiangsu with areas over 100,000 mu all have lake district fishery production management committees, with 998 full-time

lake management personnel altogether, of which over 70 are state cadres. As for lake district management, they are working toward combining full-time management with management by the masses and carrying out the registration of full-time and part-time fishermen, vessels, nets and equipment used in lake fishery production and issuing fishing permits in order to control overcatching. Chao Hu in Anhui has set up a Fishing Development Company and has also established a Marine Public Security organ to insure the implementation of the fishing management regulations and system.

B. We have adopted a set of measures to protect and further propagate lake marine product resources. One measure is the natural propagation of fish. The lake management organs formulated a series of concrete measures to protect marine product resources, with the major emphasis on implementing propagation protection periods (both seasonal and perennial) and propagation protection areas (both sections of a lake and entire lakes). For example, they set periods in which fishing is prohibited, areas where fishing is prohibited, fish sizes for 'keeping,' fishing tackle laws, etc. A second measure is the artificial propagation of resources. This is mainly through annual stocking of a certain number of domesticated fingerlings--carp, crucian carp fry and crab and eel fry, etc. For example, in Jiangsu, each year they spend between 100 and 200 million yuan in propagation expenditures for fingerlings to stock 11 large- and middle-size lakes. Moreover, they retrieve a certain ratio of resource replenishment fees from the fishermen and use it again for the artificial stocking of that particular lake. They have also launched the planting of over 200,000 mu of aquatic plants by the masses along the lake shore. Through the adoption of the combined measures of natural protection and artificial breeding, lake resources are just now gradually recovering.

C. We have energetically developed lake breeding. In 1981, the breeding area of the five provinces and one municipality in the middle and lower reaches of the Chang Jiang had reached 4,487,300 mu, or 60.8 percent of the total national lake area already used for breeding, and was 49.22 percent of the 9,115,000 mu area which can be used for breeding in the middle and lower reaches of the Chang Jiang. The lake breeding yield of the five provinces and one municipality was 60,928 tons, or 90.17 percent of the national total lake breeding yield. The average yield per unit was 27.15 jin per mu, which is 8.85 jin per mu higher than the average national yield per unit for lake breeding (18.3 jin per mu).

D. The level of scientific fish culture is constantly rising. (1) We are gradually increasing the number of fingerlings per mu used for stocking. For Hubei's Moshui Hu, which has the greatest number, the lake management organs put in 90 jin of fingerlings per mu. The fingerlings' standard size is 3 to 5 inches, some even as large as 7 inches, and they even put in "whoopers" of over a half-jin. They have gradually changed the varieties from the relatively mono-varietal silver carp, variegated carp and grass carp to carp, crucian carp, black carp, fine-scaled slant-jawed gu, crab and eel fry and some new varieties as well. They are moving away from buying fingerlings to raising their own; from depending on fingerling breeding ponds to the development of lake net box breeding, lake and river branch breeding, net barrier lake and river branch breeding, paddy field breeding, adult fish pond breeding, etc.;

and from one breeding season per year to multiple-season breeding of two or three seasons per year. In feed, we have adopted various methods such as manufacturing commercial feed, planting green grass, casting manure, applying chemical fertilizer, etc. and have raised the survival rate of the fingerlings while lowering the cost. (2) Facilities to prevent escape have developed from simple bamboo barriers to net barriers or the use of permanent fish barrier facilities made of reinforced concrete. (3) We have developed from depending on natural feed for fish cultivation to applying fertilizer, planting greens and bringing in sewage water. (4) Stocking and cultivation methods have changed from one-time stockings and catches to multiple stockings and catches. (5) They have carried out lake improvements in order to meet the needs of production. For example, in Shuanghua Hu of Hunan's Ruanjiang County, they divided what was originally a large, 600-mu lake into three 200-mu lakes and raised the yield from 38 jin per mu to 267 jin per mu. (6) Fishing technology has gone from scattering [methods], barriers/traps, the driving and spearing of fish and joint expanding. Currently, we have accumulated quite a lot of experience in lake breeding and created high-yield representative models, as in Jinji Hu of Suzhou City, which has adopted a visual [?] feeding situation to stock increasing numbers of large-scale silver carp and variegated carp, rationalized the amount they stock, set up facilities for trapping fish, improved the breeding methods and improved fishing technology and other comprehensive measures. They have raised the yield per unit from 35 jin to over 200 jin and turned the situation around from a deficit fishing ground to a profitable fishing ground.

E. We have adopted combined, coordinated management methods of breeding, raising and processing and thus developed a diversified economy. Sanjiaoju Dang in Huangqiao Commune, of Jiangsu's Wu County, with an area of only 200 mu, bred fingerlings in net baskets close to shore and raised adult fish in the lake, while at the same time raising pearls. They raised domesticated fowl and animals on the lake shore. The output value per mu of water surface reached 225 yuan, with a 75-yuan profit. The Chong Hu fishing grounds in Hubei's Gonggan County concentrated solely on the fishing industry between 1964 and 1969, and constantly showed a deficit. But in 1970, they started to get a good handle on a diversified economy, for while still raising fish, they also grew water lilies, raised pigs, managed a flour mill and liquor plant, etc. and gradually turned from deficit to profit, so that in 1981 their total output value was 394,000 yuan, of which 46.7 percent was the output value of the diversified economic sector.

At present, the major problems facing lake fishery are:

A. Management organs are not healthy; they lack both personnel and funding. For example, at Poyang Hu with a 5.86-million-mu water surface, the province set up a lake, harbor and marsh Main Management Station, with branch stations in 11 counties along the shore. There are 103 people altogether, with each person managing an average of over 50,000 mu of water surface. Although many areas set up lake management organs and formulated some regulations, because (1) they had no funding and (2) they had no power and support in various areas was insufficient, it was very difficult to move ahead with their work.

B. In the past there has been no way to control fishing. In large- and middle-size lakes, the extent of fishing has already far surpassed the reproductive capacity of the resources. Yet in recent years there have been large-scale increases in the number of vessels and nets used. According to a 1980 survey of East Dongting Hu, there was a total of 3,821 production vessels in the entire area, a 40 percent increase over 1979. Of that number, there was a very great increase of 169 motorized fishing vessels, with fairly large fishing capacities. At the same time, harmful fishing equipment increased, particularly the various maze-like contraptions which inflicted heavy damage on fish resources. For example, in 1972, there were only 2 maze-like contraptions on Poyang Hu, but by the end of 1981, the number had increased to 726, and by the end of 1982, the figure had reached over 2,100. The annual fish catch is 25.2 million jin, equivalent to over half the catch of the entire province. Even more worthy of our attention are the illegal fishing activities of using explosives and poison and the continual existence of a situation whereby fish are taken by the irrational dyking and filling in of bays and such.

C. Aquatic grass resources have been severely damaged by the silting in, dyking and reclamation of the lakes. For example, in the early 1950's, Hubei had 1,066 lakes, but now there are only 326. In 30 years, the number of lakes has decreased by 740, and the water surface area has fallen from 12.5 million mu to 3.04 million mu. There is a severe silting up of the lakes, and each year the level of the lake beds rises 3.7 cm. Through the years, 230,000 mu of Tai Hu have been reclaimed, so that now not even 10 percent of the total lake area has aquatic plants, and of that, most are wild rice and reeds which are not easily utilized by fish. East Dongting originally had 38 spawning grounds, but these have now fallen to 12; the number of maturing grounds has fallen from 55 to 12, and the number of wintering-over grounds has fallen from 14 to 7.

D. There is the lake water pollution problem. Along with the development of industrialization and the increased amounts of chemical fertilizer and pesticides applied to farmlands, there has been a constant spread of water pollution. For example, in 1980 the entire lake region of Dongting Hu used 8.8 tons of agricultural chemicals, of which 80 percent were organic nitrogen farm chemicals. These agricultural chemicals flowed into the lake and caused great harm to the aquatic plants and animals. And beyond this, industries and mining operations along the lake shores continue to discharge large quantities of toxic waste and sludge into the lake without cease.

E. We lack full production equipment. Because we are short of funds and materials for developing production, our production equipment is relatively poor. Take fingerling ponds, for example, which are the most basic facility for lake breeding. Calculating at a 200-jin fingerling production capacity for each mu of pond and calculating per-mu yield for lakes over 10,000 mu at 50 jin, then between 3.5 and 5 percent of lake area in fingerling ponds must be provided; and calculating per-mu yield for lakes under 10,000 at 100 jin per mu, then between 7 and 10 percent of lake area in fingerling ponds must be provided. And for the most part we have not reached that proportion. Moreover, the quality of fingerling ponds is low. Most were constructed in the



1960's, and so through the years they have fallen into disrepair. Most are fairly shallow, and their productivity is not high. In addition, there are few facilities for trapping fish, and their quality is low. A survey of Gong'an County in Hubei showed that they needed to construct fish traps in 105 locations. They have already constructed them in 44 locations, or 41.9 percent. Of these only 12 are pretty good. Another 32 others are flimsy and would wash away once they met a flood. And others are basically unusable.

F. The water utilization rate is low. The middle and lower reaches of the Chang Jiang have 9.91 million mu of water surface that can be used for fish culture, and they have already developed and now use only 49 percent. Moreover, the yield per unit is low, and the economic benefit is not high. For example, in Ruanjiang County of Hunan, the per-unit output value for farmland is 155.54 yuan, the output value for commercial crops is between 100 and 250 yuan but the output value for lake water surface area is only 29.9 yuan. In Honghu County of Hubei, the output value per mu for farmland is 125 yuan, but the output value for lake water surface is 27.4 yuan. So there is a very wide discrepancy between them. The main reason is that the fingerlings used to stock the lakes are small, few in number and mono-varietal. The size of fingerlings used to stock some breeding lakes in the middle and lower reaches of the Chang Jiang is generally about 3 cun. As for the composition of the fish varieties, the proportion of black carp and grass carp is small. They are primarily the fry of carp, crucian carp, bream and triangular bream, and their survival rate is not high.

G. There has been a rapid growth in the work force, whose educational levels and technological capabilities are low and whose standard of management is poor. In the lake breeding grounds of the five provinces of the middle and lower reaches of the Chang Jiang, the most rapid growth in the work force in the last 20 years has been at a rate of 4.5 times, and the lowest 1.68 times. The 6 lake breeding grounds have altogether 495 workers. Of that number, 2 have a college education, 14 have a senior middle school education, 77 have a junior middle school education, 95 have an elementary school education and the others are either illiterate or semiliterate. The educational level of the fishermen is even lower. Their technological capability and management standards are both very poor.

To sum up the above, at present fishery faces severe problems. The catches for natural large-scale commercial fishing have dropped greatly, and the proportion of the small, inferior breeds of wild fish is rising. At the same time, the individual commercial fish are getting smaller, and the main objective of fishing has become adult fish in their prime. Moreover, young fish have become a supplemental spawning population. These conditions show that the fertility of the colonies of species is falling and that the resources are clearly in decline.

## 2. Developing the Potential and Dominant Position of Lake Fishery in the Middle and Lower Reaches of the Chang Jiang

A. There are 4,033 lakes, both large and small, in the middle and lower reaches of the Chang Jiang, with an area of 39.63 million mu. Of this, fish

culture is possible in 9,115,000 mu, but 50 percent of this area still has not been developed and used. At present, the average yield per unit for large- and small-scale lakes is not even 10 jin, but according to estimates determined for natural lake feeding, the per-mu potential for all lakes is over 30 jin, and if you compare it with Moshui Hu and Jinji Hu, with a relatively high level of scientific fish culture (200-500 yield per mu), then the potential is even higher.

B. The geographic position of the middle and lower reaches of the Chang Jiang is excellent. Light, heat, water, climate, soil and other natural conditions are all beneficial to the propagation and growth of fish, shrimp, crab, shellfish and feed organisms in the lakes. At the same time, there is a dense population; rich, fertile farmland soil, with a large amount of fertilizer applied; and abundant sources of outside feed. All this is beneficial to the development of fishery. For example, one small, 200-mu lake in Taoyuan County's Maocao Commune has no input of man-made material of any sort other than the annual stocking of fingerlings, yet the annual yield is up to 20,000 jin, or a per-mu yield of 100 jin.

C. Lake fishery developed fairly early in the middle and lower reaches of the Chang Jiang, and the people there all have abundant experience in both fishing and breeding. And they already have mature experience in small-lake management. This can be extended for use in large- and middle-size lakes. For example, artificial stocking technology involves a combined cultivation of many varieties of fish, stocked at many different times by many different [administrative] levels and following various paths in order to raise large-size fingerlings. In both resource protection and propagation, they have already synthesized fairly effective measures for protecting resources in accordance with the principles of lake fish ecology. And they already have achieved some results in the comprehensive utilization of the water body and in the development of a diversified economy. Lessons can be drawn from this.

D. The middle and lower reaches of the Chang Jiang have a fairly high population density, convenient communication and a fairly high level of scientific education. There are quite a number of institutions of higher learning and scientific units, and the technological capabilities of various units for marine product administration and of business undertakings, etc. are more substantial than in other areas. This provides excellent scientific and technological conditions for the development of lake fishery. And, in addition, it has a fairly large surplus labor force, which is beneficial for developing the overall utilization of the water, developing a diversified economy and realizing the comprehensive development of fishery, industry and commerce.

E. Lake fishery has the merit of small investment, large profit, fast results and a high commodity rate. The 13 state-run lake fishery grounds in Hubei have a total investment of 4,652,000 yuan and a profit of 6,320,300 yuan. Before these fishing grounds were set up, the output was 2,822,200 jin, but after they were established, it rose to 9,446,000 jin, a 3.34-fold increase. Each yuan of investment, on a yearly average, increased the yield of fresh fish by 1.48 jin, so that the annual average [state revenue]

accumulation was 1.11 yuan. To sum up, the investment for lake fishery is small and the profit large, and generally brings results the year after it is set up.

The commodity rate for lake fishery is relatively high, generally 80-90 percent. Take Ouyang City as an example. The total commodity amount for the city is 21,800 dan. Of this, 8,600 is an outer lake commodity amount, or 39.44 percent, 11,500 dan is an inner lake commodity amount, or 52.27 percent, and the reservoir commodity amount is 1,000 dan, or 4.58 percent. The base commodity amount is 700 dan, or 3.21 percent. Commercial fish taken from the inner and outer lakes combined are 20,100 dan, or 92.2 percent of the total amount of commercial fish.

Because a lake does not require the input of feed and the labor productivity is high, the economic results are good. Generally, for a lake, one person can manage over 100 mu, even up to 150 mu. But for a pond, one person can only manage 10-15 mu. According to a survey for the Helong Hu fishing ground in Hunan, the cost for each jin of adult fish raised in a large lake was 0.291 yuan, but the cost for each jin of a commercial fish source was 0.43. Again, according to a Marine Product Bureau survey in Jiangsu in 1978, from a production brigade of Tai Hu Commune in Wu County, the cost for catching 1 dan of fish was 9 yuan, but during the same year for the Xisi Production Brigade of Huangqiao Commune in Wu County, the cost of raising each dan of fish in a pond was 41.29 yuan. Viewed in terms of the economic results, lake fishery is much better than pond cultivation.

### 3. Tentative Strategic Development Plans for Lake Fishery in the Middle and Lower Reaches of the Chang Jiang

Our tentative strategic development plans for lake fishery in the middle and lower reaches of the Chang Jiang until the end of the century are:

A. Protect the fishery resources of large- and middle-size lakes, improve the fish networks and set up procedures so as to raise the fishing yield steadily.

- 1) Implement effective protective measures for major commercial breeding populations and young fish.
- 2) Restore aquatic plants in large- and middle-size lakes so that the plant cover reaches 30 percent of the area and plant trees in mountainous districts and along the lake shores so as to bring the amount of mud and sand entering the lakes under control gradually.
- 3) Set up regulations for the size of the catch, control the amount of the catch and shorten the fishing period, in accordance with the reproductive capacity of lake resources so that fish will have time to grow and fill out, propagate later generations and enlarge the species.
- 4) Use legal methods to stop lakeshore plants, mines and other enterprises from discharging the "three waste waters" untreated into the lake.
- 5) Consult with water conservation departments, jointly fix the lowest water level and do a good job in filling the rivers with fry in order to increase lake resources.
- 6) Scientifically manage the aquatic product resources of lake water, in accordance with the principles of fish ecology and economics, and work toward planned production.
- 7) Set up sound lake management organs, conscientiously implement the national

"Fishery Law" and "Regulations To Protect the Reproduction of Aquatic Resources" and protect resources and the aquatic environment.

B. Foster fish culture in all small- and middle-size lakes that are suited to it, raise the scientific level of fish culture and raise and stabilize the yield per unit of area.

1) Mobilize state, collective and individual units to adopt various forms in fostering fish culture in all lakes of 10 million mu which are suited to fish culture. 2) Improve production facilities, set up fry-breeding and feed bases and perfect fish-trapping facilities. 3) Introduce superior varieties, stock large-scale fingerlings, work toward sufficient fingerling quantities and toward stocking the varieties that suit the need, rationally fix the variety proportions and give full play to the multidimensional potential and the potential for developing a variety of feed types in the lakes' waters. 4) Open up various routes; combine measures for fry, cultivation, selection and processing; enhance the application of fertilizers and the stocking of feed in the lakes; and increase the lakes' nutrient matter in order to raise the matter and energy transformation capability of the lakes and to increase fish products. 5) Beginning with actual conditions, improve the breeding system and work toward scientific fish culture. 6) Improve the organization of economic management, carry out the various kinds of joint management and joint production responsibility system and arouse the enthusiasm of various quarters in the lake regions for setting up lake fishery.

C. Beginning from actual conditions, gradually set up rational economic structures. These should include technological and economic structures, ownership structures, production and marketing structures, investment structures, etc.

D. Diversify the economy and utilize it comprehensively so as to raise economic results.

1) Allow lakes to have full play to the productive potential of the waters. Starting with the actual situation of local resources, suit measures to local conditions, develop a diversified economy in which fish culture is the primary activity, while at the same time raising lotus, lotus roots, water chestnuts and Gorgon fruit (*Euryale ferox*); engaging in pearl culture; raising poultry and hogs; planting trees; and farming. Establish a fairly complete water-based agriculture. 2) In accordance with what is possible, develop processing, manufacturing, sideline occupations and commerce in order to raise the use of the material cycle and rationally arrange the labor force in order to raise economic results.

E. Relax policies, arouse the enthusiasm of various quarters and utilize all lakes, large, middle and small. Promote the development of lake fishery and raise the commodity rate.

1) Adopt various joint management forms, arouse the enthusiasm of state, collective and individual units to develop lake fishery and find solutions to problems such as the difficulty of managing the large water surface of lakes, the large investment required and the contradiction between agriculture and

fishery. 2) We must work toward guaranteeing the grain and oil necessities of lake fishermen just as we do for vegetable farmers. Adjust and rationalize purchase and sale policies, so that the grassroots level will have the enthusiasm to increase production. As for that portion above the state purchase, they may negotiate a price and offer it for sale, or they may take it to the free market. They are permitted to increase their income from the amount that surpasses the quota. We must link fishing with production and marketing and promote more commercial fishing. 3) With large water surfaces, high yields and concentrated commodity amounts, the commercial departments must do well in purchasing, refrigeration and transportation work. In purchasing fish products, we must discuss price according to quality and must encourage the production of good, large fish and the reduction of spoilage. 4) Raising the commodity rate of lake fishery requires that the state operations be larger than the collective and that the collective operations be larger than the individual. The proportion ought to be state, 80 percent, and the collective, 50 percent [sic]. Individual joint management does not have allocation and purchasing tasks, but must pay taxes.

F. Enhance the investment of intelligence, raise the level of intelligence and form cadre ranks that are educated, understand their work, have a good grasp of aquatic product technology and can both manage and work in order to develop lake fishery. Scientific technology is one primary impetus in developing production. We must build up lake fishery, achieve the goals of high production, high efficiency, low cost and high quality and get a firm hold on the basic links of education and science. Concrete methods are: 1) Starting now, we must adopt various routes, various forms and various methods to raise the educational level of those engaged in aquatic production work, particularly those under the age of 45, and have them study specialized fishery know-how. 2) We must assign graduates of institutions of higher learning to work in lake areas and organize our present technical cadres in a planned way to carry out technological exchange and scholarly research, so as to advance them further. We must give attention to solving the working and living difficulties of scientific and technical personnel and enable them to be at ease in going about their lake fishery work. We should boldly select those who clearly have organizational ability and place them in leadership positions. 3) The leaders and management cadres of lake production units should adopt the measure of substitute training at institutions of higher learning and research institutes or send people to lecture and organize the study of economic theory and of management know-how. 4) State research organs and institutions of higher learning should make the crucial problems and basic theory of current lake fishery part of their research task. We must carry out research on various forms of lake science and technology, step by step in a planned, organized way, and gradually create a unique theory of lake science, advanced fish culture technology and scientific management methods.

G. Raise the educational and material life of fishermen and fishery workers fairly high.

1) Implement the measure of replacing profit with taxes in lake fishery production units, in accordance with the requirements of improving the national economic structure. In regard to the after-tax profit of production units,

part should be used to expand reproduction, part should be used to raise the collective welfare and part should be used to reward staff members, workers and fishermen who made a large contribution to production. We must continually improve the living conditions, raise the level of the cultural life of the staff and workers and gradually reduce the discrepancies between town and countryside (lakes). 2) Adopt measures such as superior selection, recommendation of people for admission to school and establishment of their own spare-time school for staff members and workers to raise the scientific and educational level of fishermen and fishery workers, and we must make proper arrangements for elderly staff members and workers.

H. Lake fishery yield is to surpass 600,000 tons.

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ROLE OF SCIENCE AND TECHNOLOGY IN AGRICULTURAL PRODUCTION EMPHASIZED

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[Text] I.

To develop agricultural science and technology and make it anticipate production and construction are very important in quickening the development of agricultural production and the realization of modernization of agriculture. Marx said 100 years ago that the development of mechanized production requires the conscious utilization of natural science. He also pointed out: "The productive forces naturally include science." Engels pointed out: "Science is one of the forces which plays a driving and revolutionary role in history." The revolutionary aspect of agricultural science and technology is in its direct transformation into a productive force, thus promoting the development of agricultural production.

Ever since heavy industry came into existence in the 20th century, science and technology have promoted the socialization of agriculture and greatly increased labor productivity. According to statistics on the growth of the national economies of the economically advanced countries at the beginning of the 20th century, the results of applied science and technology accounted for about 5 percent of the growth. By the late 1970's, the results of applied science and technology accounted for 50-70 percent of the growth in quite a few countries. Thanks to the popularization of agricultural science and technology, the United States had an 81 percent increase in agricultural production and 71 percent increase in labor productivity between 1929 and 1972. One of the reasons for Japanese agriculture's rapid recovery and development in the last 30 years is that special attention has been paid to agricultural science and technology and that the results of this effort have been brought into full play in restructuring and innovating various agricultural production departments.

Agricultural science and technology have developed further in our nation since liberation in 1949 and have played a very important role in the realization of production. In the national science conference held in 1978, there were almost

3,000 scientific and technological achievements reported in the nation's agriculture, forestry, animal husbandry and fishery. Of these, 381 were evaluated as significant achievements and given awards. Over 30 of these were either close to or had attained the advanced world level. After the conference, the agricultural science and technology of our nation consolidated itself while in the midst of recovery, developed while in the midst of consolidation and again obtained some new achievements. In 1979 and 1980 alone, there were 1,067 achievements reported by various units, of which 54 received first-grade awards. All these achievements have had a great effect in promoting the rapid development of our nation's agricultural production. According to the calculation of the Institute of Agricultural Economy, Academy of Agricultural Sciences, within the 1972-80 period, 27 percent of the increase in gross national agricultural output value was realized through progress in science and technology; the rate of progress in science and technology (i.e., the annual average rate of increase in gross agricultural output value realized through progress in science and technology) was 1.58, giving the society an annual average of 2.35 billion yuan in new profits.

## II.

One of the characteristics of the development of modern agriculture is the equipping of agriculture with advanced science and technology. The continuous, all-around development of agricultural science and technology has a positive effect in promoting agricultural production.

1. The development of genetic theories and the breakthrough in breeding technology increased agricultural output on a large scale.

The material base of agricultural production is in good varieties of crops. For a long time past, human beings have always paid a lot of attention to the selection and breeding of good varieties. However, significant breakthroughs came from the guidance and utilization of genetic theories. In 1918, hybrid corn was bred by American agricultural scientists and started to be popularized in the 1920's. The production increased by about 100 jin per mu every 10 years between the 1940's and the 1960's. In 1979, there were more than 400 million mu planted in this variety and the average yield per mu reached 915 jin. According to estimates, among the factors responsible for the increases in corn production, about 40-50 percent was due to the hybrid. The breakthrough in our nation's hybrids, following that of corn and gaoliang, brought about a new leap in production. In 1973, the "three lines" support was achieved in hybrid rice. In 1974, it was propagated for producing seeds. In 1976, it was popularized on a large scale. By 1981, the accumulated popularization area over 7 years was 330 million mu, and the area of paddies increased by more than 33 billion jin. In 1982, hybrid rice developed rapidly. The area planted in hybrid long-grain nonglutinous rice in the 13 provinces and cities in the south reached 82.71 million mu; the total output increased by 11 billion jin. Hybrid rice not only has resulted in gigantic economic benefits in our nation but is being popularized in some foreign countries. In 1979, Cambodia had success in its experimental planting of this variety. In 1980, it was transferred to the United States as our nation's first agricultural technology patent. Direct seeding experiments were held there, and



the result showed that production of this variety was 60 percent greater than that of the local good varieties.

2. The development of the study of irrigation, water conservation and biology opened up a new path for the improvement of low-yield fields.

The proportion of low-yield fields in the Huanghai and Huaihai Plains, areas of a lot of calamities and low yields for a long time, was almost one-third of its cultivated land. In recent years, by utilizing the principles of irrigation science and water conservation, summaries of the experience gained in the irrigation and drainage system--which combines deep furrows with dyke drainage and dyke irrigation, well irrigation with furrow drainage and saline drainage and saline land usage with river irrigation and furrow drainage--have been made, thereby providing for the comprehensive treatment of drought, waterlogging, alkalinity and infertility with some scientific bases. Presently, up to 150,000 mu in the Lingxian and Yucheng experiment areas also have been developed, and the demonstration and popularization area reached 3 million mu. The yield of grain per unit of area increased from 180-200 jin before the treatment to 465-513 jin, and of cotton from 84.5 jin in the past to 192.5 jin. The commune members' average income in the Lingxian experiment area increased from 54.1 yuan per capita in 1975 to 96.5 yuan. The total area of the red- and yellow-soil mountains in the south is about 600,000 square km. It makes up over 6 percent of the entire country's land and is one of our nation's important production areas of double-crop rice, tea and oranges, etc. For the last few years, comprehensive treatment in accordance with local conditions has resulted in great achievements, and some commodity production bases have been built, thereby making a great contribution to the country.

3. The development of plant protection science and agricultural science effectively eliminates and controls plant diseases and insect pests and weeds, decreases losses and increases output.

Locust plague has been a great calamity in our history. Ever since the establishment of the nation, scientists and technologists have been organized to do a thorough investigation and study in the locust areas. A set of "transformation and treatment combined" strategies to eliminate locusts and of methods summarized from the experiences has achieved great results. According to incomplete statistical information, the entire nation originally had over a 60-million-mu locust area. However, it has been reduced to just over 14 million mu. Between 1956 and 1965, more than 30 billion jin of grain were retrieved, which when converted to RMB was 3 billion yuan, an equivalent of about 33 times the investment put into it. The economic result is remarkable. Currently, although the number of locusts is increasing again in some parts of the country for various reasons, flocks of locusts have not been sighted and doing damage. Compared to some countries in Africa, Australia, Asia, America, etc., which are having serious locust calamities, the great achievements of our country in the study and elimination of locusts can be seen. Rust is the gravest disease confronting our nation's wheat production. In 1950, the disease spread widely in our nation, causing production to decrease by more than 12 billion jin. In 1964, the disease came back again and the area infected

reached 120 million mu. The production of Hebei, Shandong, Jiangsu, Shaanxi, Shanxi, Gansu and Beijing alone decreased by more than 2 billion jin. In 1965, Premier Zhou with his kind attention brought forward a comprehensive prevention and cure strategy: "Rely mainly on disease-resistant varieties while taking pharmaceutical prevention and cure as well as cultivation measures subsidiary." From 1965, endemic wheat dust has been basically brought under control, and the losses retrieved annually in wheat are more than 2 billion jin, which is 250 million yuan in terms of RMB.

4. The development of animal science and science of feed has increased the value of fowl and livestock feed and reduced the growing period.

The utilization of genetic theories for the cultivation of good varieties, the adoption of reproductive biology, artificial insemination and embryonic implantation techniques; the adoption of whole-valence feed, in accordance with theories of nutrition for increasing the transformation ratio of feed and shortening of the raising period; and the utilization of immunology, pathology, and advanced diagnostic techniques for the prevention and cure of diseases all have effectively promoted the development of fowl and livestock production. For example, heterosis is commonly used in raising chickens, pigs and cattle. In 1956, the annual commodity hybrid chickens made up 73.4 percent of the total commodity chickens in America. In 1976, the annual proportion reached 76 percent in Japan. The production of Canada's best hybrid layer is 258 eggs a year, the egg's average weight is 61.3 grams, with a consumption ratio to feed of 1:2.45. Great results have been achieved in the quality of variety breeding of pigs. The "Changbai zhu" [long and white pig] of Denmark is famous the world over as a good bacon-making variety.

It is also noted for its quantity of lean meat. The average daily weight gain is from 623 grams to 737 grams. The consumption of feed per kg gained decreases from 3.76 kg to 2.93 kg. The three-element hybrid combination of "Da Chang Bai" (Dayueke, Changbai, Beijing black pig) bred by our nation gains an average of 622 grams per day. The meat and feed ratio is 1:3.42. The lean meat ratio in the trunk increases from 40 percent to 58 percent. In America, a new breed of beef cattle, "Beefalo," is bred by mixing American buffalos with beef cattle. The weight gain reaches 454 kg after 8-10 months of grazing in the grassland. The beef quality is good and the production cost low. From the epidemiological, etiological and diagnostical study of epidemic anemia in horses, our country has obtained great results, finding that weak poison vaccine is safe and stable enough to use in horses and gives good immunity. This achievement has aroused attention in quite a few countries.

5. The development of agricultural machinery science and physics increases the labor productivity ratio by a large scale.

One of the comprehensive indicators of modern agriculture is the increase in the labor productivity ratio. However, a lot of attention is paid to the measures of mechanical technology in economically advanced countries. Take America for example. It realized basic agricultural mechanization in 1940. Currently, most of the production processes of crops are completely mechanized, thus increasing the labor productivity ratio by a large scale. Japan started

to practice agricultural mechanization in 1946. By 1967, it had basically realized agricultural mechanization. The average tilling area of a walking tractor was 32.6 mu, while that of a medium or small tractor was 2,335 mu. As a result, the labor force was greatly liberated, and the output was effectively increased. Agricultural mechanization is developing very fast in our country. At present, our country owns more than 3 million large-, medium- and small-size tractors with a total of 220 million horsepower. The proportion of area plowed by tractors reached 42 percent, of planting 14 percent, of harvesting 3.1 percent and of intertilling 3.3 percent. Mechanization has played an important role in increasing agricultural production and improving labor conditions.

Mechanized and industrialized raising of livestock and fowl has been realized in animal husbandry in the economically advanced countries. They have fattening farms which produce 500,000 head of beef cattle annually and layer farms which produce 1 million eggs every day. Only 1 or 2 people can raise more than 10,000 head of cattle. Under the conditions of industrialized raising, an 8-week-old meat chicken can weigh as much as 2 kg, a 6-month-old pig weighs 90-100 kg and the average annual milk output of a herd of high-production milk cows is 8,000-9,000 kg. In a word, without the highly advanced science of agricultural machinery, it would be impossible for the agricultural labor productivity ratio to reach its present high level. However, it also has to be pointed out that agricultural mechanization cannot work alone and show its vitality without being closely integrated with economy.

### III.

Comrade Hu Yaobang in his report in the 12th party congress brought forth the general dedication goal for national economic construction for the 20 years remaining in this century, which is to struggle to quadruple the total annual output value of the entire nation's industry and agriculture on the premise of continuously increasing economic results. That is to increase from 710 billion yuan in 1980 to about 2.8 trillion yuan in 2000. Recently, Comrade Deng Xiaoping pointed out: In the plan of quadrupling the total output value of industry and agriculture in 20 years, the total agricultural output value has to increase by 180 percent; by 2000, the grain output has to reach 960 billion jin; and if the population is limited to less than 1.2 billion, the average grain output per capita will reach 800 jin. He also pointed out: To realize a quadrupling of the agricultural output value, we should rely on a diversified economy, pisciculture, forestry and pomiculture. The important instructions of the leading comrades of the leading authorities pointed out the direction for advancement and the correct path in the overall creation of a new situation for agriculture. Science and technology are crucial to quadrupling the agricultural output value. Marx once pointed out: "The productivity of labor depends on many conditions including the average degree of proficiency of the workers, the level of development of science and how much it is utilized in work, social integration in the course of production, the scale and efficacy of the means of production and natural conditions." We believe that at the present time, in order to improve our nation's agricultural science and technology, besides paying close attention to the

adjustment and restructuring of the agricultural research system, quickening the construction speed of scientific and technological teams and improving research conditions, we have to do the following work well:

First of all, we have to deepen the understanding of agricultural science and technology's productive forces. Marxism invariably holds the view that science and technology are productive forces. However, due to the disruption caused by the leftist line, science was not respected and agricultural science and technology were thought to be dispensable over the long term. Especially during the 10 years of calamity, the "gang of four" completely negated the linchpin function of the professional scientific research organizations and professional scientific research teams. The battle line of agricultural science and technology was destroyed. Although conditions have basically improved since the 3d Plenary Session of the 11th Party Central Committee, there are quite a few gaps in some places. Therefore, we should further enhance understanding and strengthen, not only in words but more importantly in action, the leadership in agricultural science and technology by strengthening manpower, increasing budgets and improving equipment, thereby enabling the earlier regularization of the nation's agricultural science and technology so as to serve the modernization of agriculture better.

Second, vigorously pay close attention to the key scientific and technological problems and attain solid results. In the course of agricultural production, close attention should be paid to those key projects which need immediate solution, which have significant economic or social results. For example, the breeding method and the theory of new varieties of crops, livestock and fowl; the rational structure of fertilizer and application techniques, the comprehensive prevention and cure of the main plant diseases and insect pests in crops, the exploitation of feed resources for livestock and fowl and comprehensive technology for increasing production in different regions should all be stressed. Once significant progress and breakthroughs are achieved, these projects will change into direct productive forces and exert a great influence in quickening agricultural development. The basic work and theoretical research in agricultural science such as the investigation of agricultural natural resources and the drawing up of agricultural divisions, resources of animal and plant varieties, a general survey of soil and a monitoring of fertility as well as the most active fields at the present time and the rising techniques such as genetic engineering, biological nitrogen fixation, resistance mechanisms, acupuncture and anesthetic principles, immunity mechanisms, calculators, remote sensing techniques, high-speed analytical techniques, etc. should also have proper arrangements in order to strengthen technological and scientific reserves. The leadership for projects in tackling the main scientific and technological problems should be conscientiously strengthened in order to form a powerful organizational and managerial command system. A clear and definite scientific research responsibility system and strict managerial system should also be established. In order to achieve continuously new and significant scientific and technological results, the organization, planning and creating of preconditions should be implemented, materials and funds should be given precedence in arrangement and tasks should be completed punctually.

Third, conscientiously do a good job in popularizing agricultural scientific and technological achievements. A tendency to despise the popularization of achievements should be conquered, because the popularization of achievements in scientific research plays as important a role as scientific research itself. Scientific research units which have good conditions should set up technological information organizations and pay close attention to the popularization of scientific, technological achievements available and to technical services. The following is the main way to do the job: propagate and popularize scientific and technological achievements to popularization departments and production units, conduct technological lectures and training courses so as to help the using departments train technical staff, manage the centers in the rural areas and experimental areas well and expand the demonstration and popularization work.

Fourth, bring into play the extensive cooperational spirit of socialism. In organizing to tackle the key scientific and technological problems and popularizing scientific and technological achievements, we should have an overall plan so as to give full play to the strength of various areas. If related scientific research units such as those at the central and local level, agricultural colleges and universities and the Agricultural Academy are organized well, and each has its special emphasis, they will work better both in coordinating their efforts and in tackling problems. Agricultural technical departments at various levels, which also have quite a bit of power, should be very well organized and vigorously popularize scientific and technological achievements, thereby promoting the continuous development of agricultural production. Scientific and technical personnel and collectives who have contributed to the tackling of problems and the popularization of scientific and technological achievements should be rewarded in assessment, promotion and wages so as to arouse their enthusiasm and contribute more to the development of agriculture, and to realize the magnificent goal of quadrupling the gross annual output value of the industry and agriculture of the entire country by the end of this century.

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DEVELOPMENT OF FARM MECHANIZATION DISCUSSED

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[Text] I. The Place and Function of Farm Mechanization in Quadrupling Agricultural Output

In realizing the magnificent goal of "quadrupling" the gross annual output of industry and agriculture, an objective requirement is the gradual development of farm mechanization in accordance with the nation's conditions and strengths. Mechanization is not simply the "replacement" of the labor force but the transformation of scientific techniques into practical productive forces in the course of this "replacement." It is going to promote various aspects of the growth of industrial and agricultural output value.

The growth of our nation's gross agricultural output value, without doubt, depends mainly on the improvement of the productivity of the land, which, in many areas, is even the only solution. Besides the high quality of the mechanized process itself and the direct and timely effect on the increase of output resulting from the process, mechanization also utilizes and popularizes scientific and technical methods. Technologies such as good modern varieties of seeds and fertilizers and plant protection, soil improvement and water conservation all require coordination with machines. In quadrupling the gross agricultural output value, it relies mainly on the development of a diversified economy, which also calls for the adoption of machines. For example, the development of animal husbandry requires feed grinding and mixing equipment, water supply equipment and cage-raising equipment; forestry requires machinery for growing seedlings and aerial planting; and fishery requires machinery for culturing and catching and so on and so forth. Moreover, with the development of a diversified economy, the demand for processing, transporting and storing machinery, etc., becomes more manifest.

The development of the mechanization of agriculture not only will promote increases in the gross agricultural output value but, by itself, will mean increases in the gross output value of industry and agriculture. The development

of industry, besides relying on the development of markets in the cities, and the opening up of foreign markets, also relies on the gradual expansion of the markets in rural areas. One of the important things for getting industry on the track based on agriculture is to develop the agricultural machinery industry. The mechanization of agriculture will result in the development of repair work in the rural areas and of services in response to the development of the corresponding industry. At the same time, mechanization is indispensable to agricultural product processing as well as the development of small-size power plants, mines and coal pits in the rural areas.

The development of agricultural mechanization is a natural trend during the course of transformation from traditional agriculture to modern agriculture and from self- and semiself-sufficient agriculture to commodity agriculture. It is a necessary step in the realization of "quadrupling" the gross industrial and agricultural annual output value.

Comrades who have not understood well enough the significance of the mechanization of agriculture usually do not argue with the theory of the above mentioned points. Instead, they think those analyses are not integrated with our national conditions. First of all, they think that ever since the establishment of the nation, we have invested a lot in the mechanization of agriculture and have achieved very little as a result. They even think that the more mechanized we become, the poorer we will be. This is not true. We have achieved a lot through mechanization. In fact, in quite a few places, it has become an integral part in the local agricultural productive forces and has played a role in increasing production; "the more we mechanize the richer we get." Of course we also have to admit that there are many problems, even very serious problems. Second, some comrades think that ours is a country with many people and little land, an overly large labor force, backward industry and technology and short funds and, therefore, it is not appropriate for us to practice the mechanization of agriculture at the present time. We think that it was not China's national conditions which prevented the mechanization of agriculture from being done properly; instead, we believe that the mechanization of agriculture was not done in accordance with our national conditions and thus resulted in defects. This is the crux of the problems.

## II. Summarizing the Experiences and Lessons in History, Eradicating the "Bureaucratic" and "Commercial" Style of Work in Mechanization

For over 30 years, we have attained great achievements in the mechanization of agriculture. This is something which should be affirmed. However, we should sum up the lessons we learned from copying mechanically the Russian model of mechanization of agriculture, disregarding our own national conditions, and make some improvements.

There are two basic characteristics of the development model of the Soviet Union's mechanization of agriculture.

First, the Soviet Union always took the mechanization of agriculture as the only way to reform agricultural technology. It also took the route of extensive management and used machinery to plunder soil fertility.

In 1927, when the collectivization of agriculture was on the upsurge, there was still very little modern agricultural machinery. Stalin believed that the collective agricultural system would not be stable without machines. Therefore, stress was placed on the development of an agricultural machinery manufacturing industry. By 1940, the power of agricultural machinery increased to 47.5 million horsepower, and there were 684,000 standard tractors. The proportion of land cultivated by machines reached 62 percent, grain planted by machines reached 56 percent, and grain harvested by machines reached 46 percent. At that time, the Soviets declared that they had realized the basic mechanization of agriculture and had attained a decisive victory in the reformation of technology. In fact, what they had done at that time was mainly to achieve the mechanization of grain crops, in which the three main agricultural machines consisted of tractors, harvesters and automobiles. The Soviet Union is a country with plenty of land and few people where extensive management of land and extensive cultivation are traditions. In order to develop production rapidly, the Soviets had to adopt extensive cultivation by using tractors. By 1953, the power of their agricultural machinery reached 87.8 million horsepower, the number of standard tractors reached 1,239,000 and the proportion of grain crops handled mainly by machinery reached 80-90 percent. These had some effect on the restoration and development of agricultural production. However, their per-unit-area yield was still very low. The mechanization of industrial crops and animal husbandry was also very weak. After the war, Comrade Stalin brought forward the plan to remake nature, adopt good varieties, develop chemical fertilizers, increase the use of green manure and crop rotation and develop forestry and irrigation, etc. However, he died before these plans were put into practice. In 1954, Khrushchev, in order to solve the food problems, decided to undertake the large-scale reclamation of wasteland by using machines. By 1964, the power of agricultural machinery reached 218.6 million horsepower, and the number of standard tractors reached 2,821,000. The total area of wasteland reclaimed from 1954 to 1960 was 627.54 million mu. At the early stage of the reclamation of wasteland, the Soviets did get a large quantity of commodity grain. But due to the damage done to the ecological balance, the yield per unit of area, which once rose to 148 jin, went down to 111 jin again in 1963. Ever since the mid-1960's, the Soviet Union made some adjustments in their agricultural technology policies. The main points were: (1) Emphasizing intensiveness as the general line for agricultural development; (2) emphasizing comprehensive mechanization and increasing the development of the mechanization of industrial crops, animal husbandry and transportation and construction in rural areas; (3) bringing forth the slogan of chemicalization and making faster increases in the application of chemical fertilizers, pesticides and herbicides; (4) stressing the improvement of the techniques of breeding, culturing and raising; and (5) increasing agricultural investment and developing irrigation and water conservation. With these adjustments, they achieved some development in agricultural production. However, their characteristic dependence on mechanization for extensive cultivation, generally speaking, still had not changed fundamentally. Their yield per unit of area was still very low and unstable. Their grain-per-mu production was: 127 jin in 1965, 208 jin in 1970, 145 jin in 1975 and 197 jin in 1980.



Ours is a country with a lot of people and little land. We have a good tradition of intensive and meticulous farming. However, it is a pity that in the past we did not pay attention to this characteristic. In the course of developing agricultural mechanization, we mostly copied the Russian model in the following ways: (1) By emphasizing that we could only have collectivization before we had mechanization and not integrating closely social reform with technical reform; (2) by emphasizing that the fundamental line of agriculture was to realize electrification and mechanization on the basis of collectivization, thereby resulting in the trend of neglecting the biological techniques and other agricultural technical reforms and repeatedly making mistakes by blindly increasing the speed of the mechanization of agriculture; (3) by limiting the mechanization of agriculture almost entirely to grain crops and thereby creating the impression that once one had tractors, one had achieved mechanization and modernization; (4) by placing stress on copying the Russian large-size railing and tracting style of machines, which were not appropriate for our national conditions in most areas; and (5) by copying extensive cultivation in the use of machines and paying no attention to its integration with our traditionally intensive and meticulous farming nor to its integration with modern agricultural scientific techniques. Therefore, the use of machines did not have much effect on increasing production, on the one hand, and labor productivity did not increase much either, on the other hand, because the workers whose labor was saved could only stand around in the field.

We should see that mechanization can absolutely become the means of intensive management. Lenin repeatedly emphasized the importance of mechanization to increasing production. He also pointed out that the adoption of machines was an important sign of intensive management in agriculture. The mechanization of Western Europe, Japan and postwar America all proved the accuracy of Lenin's above mentioned judgment. Our country's practice also proved that mechanization was not only welcome in extensive farming areas with few people and a lot of space (such as the Great Northern Wilderness [in northeast China]), but many intensive farming areas with many people and little space (such as the Changjiang Delta, Zhujiang Delta and Huguang Plain, etc.) were among the places where mechanization developed earlier.

Second, agricultural machinery was used as a method to control agriculture in the Soviet Union's history. It was also excluded from the production of commodities, thereby seriously affecting the economic benefits of using machines.

During the high tide of collectivization, the collective farms were very unstable in the earlier stages due to the violation of Lenin's voluntary principle. For this reason, state-run agricultural machinery stations were adopted. The stations tilled the land for the collective farms and controlled the farms' production, thereby putting agricultural production in a highly concentrated overall plan. Also, the reward in kind received for tilling was an important form through which the state obtained commodity grain and other commodity agricultural products. (The proportion of the reward in kind that the machinery stations received for tilling made up the total agricultural products procured by the state: the proportion was only 16 percent in 1933, 42.1 percent in 1937 and reached 58.2 percent in 1953.) As it was stipulated in explicit terms and as it was in fact, the machinery stations

had become the organizers and leaders of collective farms. Besides, they also excluded production materials as commodities on a long-term basis, only admitting that they had the appearance of commodities. Stalin even severely criticized the suggestions of some Russian economists to sell agricultural machinery to collective farms. He believed that this policy would "cause the collective farm to go bankrupt, and destroy the mechanization of agriculture," "would cause the collective farm ownership system to be further away from the system of ownership by the whole people," "would enlarge the range of the circulation of commodities" and "would block our progress toward communism."

In so doing, the Soviet Union seriously fettered the peasants' enthusiasm inevitably resulting in the following problems: (1) The separation of agricultural production tools from the peasants caused the peasants to be careless, nor was it possible for them to be concerned with the allocation and utilization of machines; (2) the indifferent allocation and utilization of machines of the machinery stations caused a lot of waste and raised the cost because they could not get away from the general deficit situation of the machinery stations; (3) the machinery stations, instead of watching the quality of their work, just pursued the speed of work, thereby resulting in low economic results from the utilization of machines; and (4) the two sets of costs added to the peasants' burden. Although after the late 1950's, they started to sell machines to the collective farms, the entire social and economical model had the flaw of lacking economic activity due to the severe bureaucracy which still exists today and other reasons, making the economic results of using agricultural machines still low.

At the beginning of the establishment of the nation, it was necessary for us to set up some state-run agricultural machinery stations. The problem was that the policy of the mechanization of agriculture depended entirely on the state and excluded the peasants' labor and was therefore responsible for almost all the managerial drawbacks which existed in the Russian machinery stations. In the late 1950's, we changed this principle to one in which mainly the peasants did collective purchasing, and thus we improved the situation. However, as it was held back by leftist ideology, the restructuring was far from being complete: (1) The transfer of the state-run machinery stations to the principle of collective purchase was not settled until, after repeated twists and turns among organizations, the first national agricultural machinery conference was held in 1966; (2) most of the machines were still owned by the communes and brigades, the conflicts which existed between state-run machinery stations and cooperatives became those between commune-brigade machinery stations (teams) and production brigades and the problems basically remained unchanged; (3) the "eating from the same big pot" problem still existed within the commune-brigade machinery stations; and (4) machines still could not become real commodities. As a result of the strict plan, the supply of machines was more often than not separated from the demand for production, therefore not only causing waste but also making it impossible to root out the style of the "bureaucratic workers" and "bureaucratic merchants" in the mechanization of agriculture.

### III. Adapt to the New Situation After the Practice of Responsibility System of Linking Remuneration to Output, and Carry Out the New Strategies for the Mechanization of Agriculture

The party Central Committee proposes that we should contract a socialist agriculture characteristic of China, and that we should follow our own line in the modernization of agriculture. This includes following our own line in the mechanization of agriculture, thereby creating a new situation in the mechanization of agriculture.

Presently, there exists in our society a common worry that the responsibility system linking remuneration to output, especially the system of contracting work tasks to individual households, will hinder the development of the mechanization of agriculture at the present time or in the future. This is a misunderstanding.

In fact, the practice of the responsibility system linking remuneration to output, which stresses the system of contracting work tasks to individual households, is the premise and the advantageous condition for creating a new situation for the mechanization of agriculture. The prosperous and flourishing rural economy makes the mechanization of agriculture necessary and possible. During the course of the practice of the contract responsibility system linking remuneration to output, a few phenomena appeared in some places where agricultural machines were not welcome and were left unused, the proportion of tilling machines went down and people demolished the agricultural machinery, etc. This was mainly because people had little experience in the practice of the responsibility system linking remuneration to output or because the agricultural machine work was not able to adapt to the changed situation. Presently, an upsurge has appeared in many places in the nation where the system of contracting work tasks to individual households is practiced. A lot of peasants are rushing to buy small-size agricultural machines. At the same time, the family contract system, which is a level in the organization of cooperative economy which still has some "centralization" to it, is different from the small-scale peasant economy. It can undertake the mechanical work which the family economy cannot. With the gradual specialization of the family contract system, its scale can also be gradually increased.

The system of contracting work tasks to individual households has brought many new problems to the mechanization ever since its practice: We have to investigate the developmental principle of agricultural mechanization; we have to study the national conditions, summarize the lessons from the experiences and follow the new situations; and we have to carry out the new strategies for mechanization. The following are of importance:

1. Do not blindly pursue the developmental speed of the mechanization of agriculture. Set out on the basis of practicality and stress economic results. Make it clear that the purpose of the mechanization of agriculture is to realize the strategic goal, and to serve to quadruple the gross annual output value of industry and agriculture. The development of mechanization should be based on the realization of increased production, and made advantageous to the improvement of yield per unit of area. Instead of practicing extensive

cultivation, we should make the development a means to intensive management. We should put the quality of mechanical processes in first place and make machines serve the popularization of proper modernized agricultural technology while adapting to the retained superior features of traditional intensive cultivation, thereby creating our very own agricultural machinery system. Only when the unit production cost of using machines is lower than that of using human and animal power will the peasants use machines. Also, we have to require that the investment for purchasing machines be within the peasants' ability, that it be regained through the profit within a short time and that outlets be found for the "replaced" human and animal power.

2. Change the principle which stresses only mechanization to cultivate grain to one which "will never slacken grain production and will enthusiastically develop a diversified economy." We should not give up the mechanization of grain cultivation, especially the mechanization of commodity grain bases and specialized grain households, which should still be among the works to be stressed. Ever since the adoption of the responsibility system in the rural areas, the development of a diversified economy has also been flourishing, even faster than that of grain. The contracting households (group) and privately run households of various kinds of diversified economies appeared as commodity producers right from the beginning. Their demand for mechanization is even more pressing. Besides, special attention should be paid to the development of machinery needed for transportation, processing, storing, basic construction, power stations, etc., in the rural areas. We should change the structure of agricultural machinery products and expand the agricultural machinery service area, thereby making the road to the mechanization of agriculture wider and wider.

3. Transform the more unitary agricultural machinery ownership system and management pattern to something which allows the coexistence of a diversified agricultural machinery ownership system and management pattern. The ownership system and management pattern of agricultural machinery should make adjustments in order to suit the diversified economy and management pattern which coexist in our nation's rural areas. Most of the machines, except those belonging to the state-run farms and those still needing state-run machinery stations owned by the whole people, should directly belong to and be managed by the peasants. To support agricultural machinery, the state should give loans and necessary price subsidies, and not take the whole thing over. The peasants can own agricultural machines collectively or individually, they can run their businesses privately or they can do commercial service. Machines owned and managed by the communes or even owned and managed by the brigades are no longer the main point. They have been owned by the households and managed by the peasants for a long time. Since the main body of the rural areas is based on the family contract, which is a centralized and separate cooperative economy, the peasants' enthusiasm in purchasing and utilizing machines should then be aroused. This will not affect the socialistic quality of the cooperative economy. Of course, this will need more vigorous development of small-size agricultural machinery so as to adapt to the new situation. Viewed from the angle of utilization, small-size agricultural machines are not as good as their large-size counterparts. However, when viewed from the overall situation, this is the better solution for the time being. Besides, the

tender care and careful utilization by the families will make up for the low-productivity drawback of the small-size machines, and with the specialization and unceasing expansion in scale of the family contracts, the nation's small-size agricultural machines will also gradually develop into medium-size and large-size ones. As for those medium-size or large-size machines which the peasants really need but which are not suitable for a household to buy, centralized management can be adopted and let the cooperative economy or peasant households (individual or integrated) run the mechanical service stations. Some mechanical services can even be undertaken by grain stations, supply and marketing cooperatives or other socialist economic units. Individual households or private specialized households should also be allowed to buy small-size machines or even some medium- or large-size machines and start contract services.

4. Change the "bureaucratic worker" and "bureaucratic merchant" style of work to something which complies with economic principles. The key here is to treat agricultural machinery products as real commodities and allow the peasants to choose and purchase according to their individual needs, thereby enabling the national distribution of agricultural machines to where they are really needed, enabling the achievement of rational scale and scientific allocation and enabling the meticulous utilization, maintenance and repair of machines. Production and sales departments of agricultural machinery production units should lower their production and circulation costs as much as possible and stress "quality first" and "customers first." In a word, once agricultural machinery becomes a real commodity, it will be hard for the unhealthy styles of "bureaucratic workers" and "bureaucratic merchants" to exist. Thus, mechanization will gain from the economic vitality of domestic development.

12369

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## RURAL ECONOMIC SURVEY RESULTS

Beijing NONGYE JISHU JINGJI [Economics for Agricultural Production Technology] in Chinese No 6, Jun 83 pp 15-18

[Article by the Rural Work Department of the Anhui Provincial Committee of the CPS: "Investigative Report on Anhui's Rural Economy in 1982"]

[Text] In 1982, for the 2nd straight year after Anhui adopted the great contract responsibility system, the province investigated its rural economy. The objects of the investigation included the 11,255 representative commune households surveyed in 1981 (the number was adjusted slightly upward). These households were distributed among 1,373 communes, 2,971 production brigades and 4,767 production teams located in 74 counties and cities and in 8 suburban areas under the provincial government's direct control. The investigation indicates that Anhui's countryside is thriving and becoming better and better. Agriculture, the foundation of the national economy, is daily becoming more solid and is filling us with hope for the acceleration of its own modernization.

#### I. Agriculture's Great Contract Economy Has Been Rigorously Tested and Has Yielded Bumper Harvests in a Year of Great Natural Calamity.

Last year, 1982, was the 4th year of Anhui's great contract responsibility system in agriculture. In that year occurred the province's fourth serious flooding and waterlogging disaster since the founding of the People's Republic. The three previous ones each struck more than 10 million mu, causing an average annual reduction of 2.8 billion jin in grain output. Although the fourth disaster struck 16 million mu (including 6 million whose harvest it prevented), there was no reduction in production. On the contrary, grain production topped 1981's level, then the highest in history, by 2.9 billion jin, for a total of 38.6 billion. What were the reasons for this? The key lies in the adoption of the great contract responsibility system.

Let us compare all data with their counterparts in 1981, when the previous historical peak was reached. Per-capita grain output rose 7.8 percent to 1,181 jin while per-capita oil crop output rose 16.6 percent to 80 jin. In terms of animals removed from inventory per household, the number of big porkers rose 8.2 percent to 1.05, while that of poultry rose 17.5 percent to 24.8; those birds laid 44.1 jin of eggs, up 11 percent. Gross per-capita income from

agriculture, forestry, animal husbandry, sideline occupations, fishing and industry jumped 13.3 percent to 393.1 yuan. After deduction of production outlays, state taxes and collective withholdings, the net per-capita income of commune members was 285.1 yuan, for an increase of 10.1 percent. Of that net income, contract income accounted for 195.1 yuan, for an increase of 8.9 percent; the rest came from peasants' own enterprises and rose 15.4 percent. Per-capita sales of grain to the state were 297 jin (up 14.7 percent); oil crops, 55 jin (up 22.2 percent); and cotton, 7.7 jin (up 0.5 percent). Sales per household of big prokers to the state were 0.72 head (up 14.3 percent); poultry, 6.3 birds (up 70.3 percent); and eggs, 22.6 jin (up 13.6 percent).

Because of the great contract responsibility system, peasants directly possess the right of self-management. Thus, in a year of great natural calamity, they can resist the bad effects of flooding and waterlogging by every possible means. After the floodwaters receded, peasants went all out to salvage flooded crops, vary crop rotation, do timely replanting, develop economic diversification, make up last season's losses the next season and make up agricultural losses through sideline occupations. Thus, they greatly reduced losses caused by the calamity. At the same time, to take precautions in areas long vulnerable to flooding and waterlogging, the masses further expanded in 1982 the acreage planted in summer harvested cereal crops that have a high yield and resistance to calamity and thus greatly compensated for the losses in autumn crops caused by the flooding and waterlogging. As for the 1,549 households surveyed in Suxian Prefecture, nearly one-fourth of their crop acreage suffered especially great damage from flooding and waterlogging. The broad masses of commune members took measures to drain that acreage, vary the crops, replant and increase output on land that was struck lightly. In addition, their remedy in the form of much higher yields in wuji cereal crops increased total annual grain output by 7.5 percent over 1981 and gross income by 6.3 percent. In localities that suffered relatively light or no damage from flooding and waterlogging, the broad peasant masses fully played their subjective dynamic role and raised output by a large margin. This was impossible during the times of production campaigns and egalitarian distribution. Also, this is precisely the profound secret to the great contract responsibility system's ability to triumph over severe flooding and waterlogging and obtain bumper harvests.

## II. The General Policy of "Absolutely No Slackening in Grain Production While Energetically Developing Economic Diversification" Has in Practice Produced Enormous Material Strength.

The investigation indicates that the peasant masses continue to place grain production above all else. While ensuring increased grain output, they have expanded economic diversification rather greatly through such measures as raising the multiple-crop index and per-unit area yield.

The surveyed households had a multiple-crop index of 181.6 percent on their cultivated land in 1982, up 9.8 percent from 1981. In item-by-item terms, acreage sown in grain rose 3.6 percent from 1981, while per-unit area yield rose from 461 to 481 jin for an increase of 4.3 percent. Although overall income per unit of area sown in cash crops did not change from 1981 because of the calamity, gross income from cash crops still rose 7.8 percent, because sown acreage increased 8.9 percent.

Income from economic diversification, as compared to income from grain, increased fairly greatly. The households surveyed in 1982 had a per-capita income from grain of 203.9 yuan, up 10.5 percent from 1981. Their per-capita income from economic diversification rose 16.6 percent to 187.5 yuan.

More and more of the peasant masses are recognizing from practice that if they depend solely on grain production, it will be quite difficult to attain quickly the standard of being "comfortably off." The instructive spirit of the Central Committee of the CPC about expanding economic diversification is becoming the motive force behind the broad masses' consciousness. Waste mountains and waters, useless for millennia, are now being opened up and utilized. According to the investigation, investment in contract harnessing of wooded mountains in 1982 rose 1.2 percent from 1981, while that in contract harnessing of water rose 32.4 percent. The momentum toward expansion of economic diversification is extremely good.

### III. Families' Animal Husbandry Has Bright Prospects.

The commune members of the households surveyed in 1982 had a per-capita income of 60.4 yuan from raising poultry. This income accounted for 52.4 percent of all income from families' own enterprises and was 102 times greater than the income (0.59 yuan per capita) from contract poultry raising by collectives. It also accounted for 15 percent of all income from all enterprises, contract and private.

This illustrates the now nearly completely decentralized management by commune members' families of production from rural animal husbandry. This had greatly accelerated the pace of expansion in animal husbandry. The 1982 investigation showed that gross income from domestic animals raised by family enterprises and by contract rose 22.4 percent from 1981: income from pigs rose 20.1 percent; from poultry, 26.3 percent; and from draft animals, 92 percent. Such high rates of expansion are unprecedented.

Survey data indicate that because of several straight years of increased grain output, per-capita ownership of grain also rose year after year (884 jin in 1982, excluding grain sold to the state). At the same time, because of greater labor efficiency, farm machinery has increased year after year, and there is a large force of surplus labor. Extra feed and labor are the two prerequisites for expanding pig, poultry and draft animal production in the countryside. The Huaibei plain, always short of animal power in the past, has expanded production in the past few years and already has a surplus of animal power. The surveyed households now have one draft animal (including young ones) per 15.5 mu of cultivated land on the average. The increase in draft animals has been rather rapid in Suxian Prefecture, where the surveyed households have one farm animal per 13.5 mu on the average and already have a surplus of draft oxen. This situation should draw attention as soon as possible, because it is now suitable for increases in draft and beef cattle.

A look at the surveyed households tells us that as long as we, from now on, stress the coordination of feed production with the prevention and cure of epidemic disease, it is entirely possible for animal husbandry production to double and redouble or increase several times in a short period.



#### IV. The Agricultural Economy Is Developing toward Intensification and Commercialization, and Its Results Are Markedly Improving.

Adoption of advanced science and technology, concentration of even more labor and funds in raising per-unit area yield, intensive cultivation and intensive farming together make up a new trend in today's agriculture that is clearly manifested in the surveyed households. After the extension of the contract system to individual households, agricultural production has developed toward intensification, as is prominently indicated by the annual increases in the live and materialized labor put into each mu of cultivated land by commune members. Calculated in terms of sown acreage, production outlays (for improved varieties, mechanization, electricity, feed and forage for farm animals, commercial fertilizer and so on) put into cereal and cash crops were 21.8 yuan per mu on the average in 1982, up 16.6 percent from 1981. They included 9 yuan for commercial fertilizer (41.3 percent of the total), which in turn included 7.9 yuan for chemical fertilizer, up 6.8 percent from 1981; and 1.1 yuan for cake and other kinds of commercial fertilizer, up 1 percent from 1981. Fertilizer did not include farm manure. At the same time, the broad masses of commune members saved money and raised economic results by paying the closest attention to cutting production outlays. As compared to 1981, in 1982 the surveyed households spent much less on farm chemicals, plastics for agricultural use, repair of farm machinery and tools and acquisition of small farm tools and miscellaneous items. Outlays for miscellaneous items fell 76.3 percent. Precisely because of all this, economic results improved markedly. In terms of sown acreage, the surveyed households realized an output value of 92.2 yuan per mu of cereal and cash crops, 5 percent higher than the 87.8 yuan realized in 1981. The input-output ration was 1:4.23 in 1982. Each able-bodied and semi-able-bodied worker created an income of 640.6 yuan in 1982, up 5.9 percent from 1981.

The households surveyed in 1982 also showed a rather great increase in their percentage of marketable products. Per-capita grain sales were 329 jin (including 32 jin put into the country fair trade) with marketable products making up 27.8 percent, up 0.7 percent from 1981. In 1982, oil crops, pigs, poultry and eggs (including by-products) had the following percentages of marketable products: 75.5 percent (up 4.7 percent from 1981) for oil crops and 62.4 percent (up 4.2 percent) for the other three.

The vigorous development of every kind of specialized and major household is accelerating the process of the commercialization of the agricultural economy. Among the households surveyed in 1982, the data on specialized and major grain households was spectacular: 1,655 (14.7 percent of the total) produced 1,501 to 2,000 jin of grain per capita; 667 (5.9 percent) produced 2,001 to 2,500 jin; and 344 (3.1 percent) produced 2,501 or more jin. These 2,666 households were 23.7 percent of all the ones surveyed; their grain output had percentages of marketable products of 50 to 70 percent.

#### V. The Peasant Masses Insist on a Gradual Improvement in Their Lives on the Foundation of Increased Production and Handle the Accumulation-consumption Relationship Rather Well.

The distribution of net per-capita income (including income from both contracts and private enterprise) for the households surveyed in 1982 was as follows: 6.2 yuan (2.1 percent) to state taxes, unchanged from 1981; 5.3 yuan (1.8 percent) to collective withholding, down 0.5 yuan; and 285.1 yuan (96.1 percent) to commune members' income, up 28.1 yuan. The interests of the state, the collective and individual commune members were all given rather good consideration.

Statistical data show that although the share of collective withholding decreased slightly, individuals' investment in extended reproduction and in the initiation of collective educational and hygienic work rose rather fast. Of the 285.1 yuan in net per-capita income for individual commune members (hereafter including income from both contracts and private enterprise), 16.7 yuan (5.9 percent) were spent on the acquisition of tractors, draft animals, large and medium farm machines and tools and other productive fixed assets; 6.3 yuan (2.3 percent) were spent on culture, education and hygiene.

Commune members' lives have markedly improved because of their foundation of expanded production. On the other hand, the speed of that improvement is still less than that of expanded production, and peasants are giving priority to the use of accumulated funds in extended reproduction. The accumulated funds paid to the state in 1982 by the surveyed households, plus the funds taken from their own net income to buy productive fixed assets, accounted for 6.1 percent of annual net income, up 26 percent from 1981. Each of those households now owns an average of 480.7 yuan in productive fixed assets (consisting of 172.8 yuan allotted by the collective for the household's own use and 307.9 yuan that commune members purchased privately). They now average one tractor per 301 mu of cultivated land, one draft animal per 18.6 mu and one big or medium farm machine or tool per 4.3 mu. The severe shortages of draft animals, big farm tools and farm machinery in past times of production campaigns have been basically reversed. Moreover, there has appeared a new trend toward renewal of tools and higher levels of mechanization. For example, there were 21.3 percent more farm machines and tools in 1982 than in 1981. Thus, a material foundation that improves daily has been created for the acceleration of agricultural development.

VI. The Rural Economy Has Already Changed Tremendously, but Peasant Families' Resources Are Not Yet Abundant: We Must Continue to Pay Attention to Reducing Their Burden.

Anhui's rural economy enjoyed fairly rapid development only after the province adopted the great contract responsibility system and other responsibility systems that link remuneration to output. That has not been a long time. In addition, each locality adopted the great contract responsibility system at different times and has different production conditions and levels of economic development. Collectives and commune members' families originally had no resources; some localities still suffer relative economic hardship.

Among the households surveyed in 1982, real per-capita expenditure for food and clothing was 173.7 yuan: 94.1 yuan for 672 jin of grain rations; 9.2 yuan for 8 jin of edible oil; 23.1 yuan for meat, fish, poultry and eggs; 2.3 yuan for sugar; 17.4 yuan for cloth (including clothes, quilts and hats); 11.3 yuan for

fuel; and 16.3 yuan for tobacco and alcohol. Expenditure for edible vegetables was not included. These expenses, except the one for tobacco and alcohol, were all for essential heat, clothing and food. Other excluded expenses were those for loan repayments, culture, education, hygiene, outlays unrelated to loans, weddings, funerals, marriages and so forth.

If we take 173.7 yuan as the lowest per-capita annual income necessary for providing heat, clothing and food, 2,199 of the surveyed households (19.5 percent) had a net per capita income of 170 yuan or less and fell below this minimum. Only 708 (6.3 percent) were in the hardship range of 120 to 130 yuan.

The investigation indicates that peasant income levels in 1982 were indeed much higher than before, as 80.5 percent of peasant households either became rich or solved the problems of heat, clothing and food. The proportion of hardship households was much lower. Real per-capita income doubled and redoubled. It is necessary to note, however, that this kind of change is only tentative, since the level of most households' income is still too low. The policy of reducing the peasants' economic burden still requires implementation in order to protect and heighten peasant enthusiasm for production and further promote expansion of production. Some localities arbitrarily apportion grain and funds outside of contracts and thus increase the peasants' burden. This is utterly harmful.

From a comprehensive survey of the data of the investigation in 1982, we can see that the development of Anhui's rural economy is just unfolding. The great contract responsibility system is winning peasants' hearts and minds every day and is displaying enormous power. At the same time it is reflecting some problems that require attention and solution. These are the main ones:

1. Regional economic development is quite uneven. Hilly areas are undergoing the fastest development, with 16 counties and cities attaining a net per-capita income of 333.9 yuan in 1982. Next come areas lying next to rivers, with 16 counties and cities having a net per-capita income of 304 yuan. The mountainous areas in western and southern Anhui are third, with 20 counties and cities having a net per-capita income of 275.2 yuan. In this group eight counties (40 percent) have net per-capita incomes below those of the surveyed households. The Huaibei plain is fourth, with 22 counties and cities having a net per-capita income of 242.7 yuan. In this group 14 counties (63.6 percent) have net per-capita incomes below those of the surveyed households. The main reasons for the great contract responsibility system and other responsibility systems that link remuneration to output did not take place everywhere at the same time; that because production conditions, especially water conservancy, varied in quality, some counties could not resist the severe flooding and waterlogging in 1982 and so produced less; and that in the mountainous areas some counties could not keep up with the forestry responsibility system, handled their economies poorly and were not good enough at launching economic diversification.

2. Forestry and fishing still are weak links. Among the households surveyed in 1982, per-capita income from forestry was only 3.3 yuan, or 0.8 percent of gross income of all occupations. That from fishing was 1.16 yuan, for 0.3 percent. The responsibility systems that link remuneration to output must be

comprehensively promoted in forestry and fishing. Its forms may be many but should all be based on the full mobilization of individual commune members' enthusiasm for production. Regions must adopt whatever method is most beneficial to development of forestry and fishing. Afforestation of waste mountains and small-scale restoration of life to bodies of water can be wholly contracted out to households (including specialized and production brigade-household combined households). Let us promote joint management, by commune members' households, of state-run and collective tree farms and fisheries. Rivers and reservoirs, under the management of water conservancy departments, that can support fish must be fully utilized for that purpose. These departments can raise fish themselves, can do so jointly with commune members' households or can have them raised by those households (or by production brigade-household combined households). Whenever there are difficulties with funds, technology, seeds, saplings, goods or materials, the relevant departments must energetically help resolve them. Departments of politics, law and public security must strengthen their protection of forestry and fishery production and resolutely stop the indiscriminate felling of trees, the theft of trees and fish, the poisoning and blasting of fish and other illegal activities.

3. The expansion of specialized households has many problems that urgently await solution. Investigation data show that the legal interests of specialized households have not yet received conscientious protection. Some are discriminated against, attacked and persecuted. Others are victims of property theft, extortion and blackmail. Their special production also lacks the necessary support from relevant departments, while some of their products are hard to market. Some localities willfully increase the economic burden of the specialized households. Every kind of rural specialized household is a main force behind the development of specialized and commercialized production and also is a leader in the fastest possible enrichment of the peasant masses. The legitimate rights and interests of specialized households must be resolutely protected; illegal behavior that damages their production must be investigated in accordance with the law. Resolution of the difficulties of the specialized households with funds, technology, goods and materials must be given top priority. At the same time, control of economic information must be stronger, lest anyone produce blindly. All kinds of state-run, collective and individual socialized service organizations must be established quickly, i.e., companies in irrigation, seeds, feed, crop protection, veterinary medicine for livestock, transport, trade and so on. Their top priority will be to serve specialized households. Some specialized households--especially those in forestry and fishing that are big, contract households with insufficient labor--may have policy restrictions on their hiring appropriately relaxed and may allow the incomes of managers and helpers to vary rather greatly. The comrades who took part in the investigation believe that adoption of the above measures can greatly accelerate the development of specialized households.

12570

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QUESTIONS ON PROMOTION OF AGRICULTURAL MECHANIZATION EXAMINED

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[Article by Xu Bu (1776 2975) of the Heilongjiang Provincial Institute of Agricultural Economics: "Examination of a Few Questions on the Promotion of Agricultural Mechanization in Heilongjiang"]

[Text] Heilongjiang is China's key commodity grain base and was the earliest in promoting agricultural mechanization. Yet how much mechanization has the province heretofore achieved after all? How do we evaluate the results of its promotion? What economic lessons should we draw therefrom? After adoption of the responsibility system in agricultural production, how will mechanization develop? This article will take a look at these questions.

I. An Appraisal of the Extent of Agricultural Mechanization in Heilongjiang.

The promotion of the mechanization of agriculture in Heilongjiang may be roughly divided into four stages:

During the first stage (1947-52), mechanized state farms were established. The second stage (1953-57) was the demonstration of rural state-run tractor stations to improve plowing on agricultural cooperatives. The third stage (1958-78) was one of great expansion. The fourth stage (1979-82) was one of an accelerated drive toward mechanization in key regions and key production brigades.

Having grown through these stages, mechanized power in Heilongjiang's agriculture now accounts for 87 percent of all power in the province's countryside. Here are the proportions of mechanization in every phase of planting and growing: 87 percent in soil preparation, 56.4 percent in intertilling, 28 percent in harvesting and 60 percent in transport. In recent years mechanization has begun to extend beyond planting and growing into the realm of economic diversification. In that case, has Heilongjiang already realized mechanization or has it done so only in the most basic way? Our view is that the term mechanization has two senses, one broad and one narrow. In the latter sense, it simply pertains to planting and growing and means a concrete analysis of the extent to which farm machinery is used therein. It may be said that the degree of mechanization in Heilongjiang is rather high, but the province has yet to achieve a "basic" degree of mechanization. The broad sense

of the term is the extent to which farm machinery is used in agriculture, forestry, animal husbandry, sideline occupations and fishing. Heilongjiang is still far from its goal of achieving a "basic" degree. For example, the level of machine power for drainage and irrigation in water conservancy is far lower than that in Shanhaiguan, while the use of machines in the province's animal husbandry, forestry and other areas of production is still just beginning. In addition, Heilongjiang's present allocation of farm machinery exhibits a big head and a small tail (great power but few complete sets of farm tools). If only the ratio of machine power to animal power is used to demonstrate the degree of mechanization, it happens to conceal a weakness in the past promotion of mechanization. This, moreover, does not favor comprehensive development of mechanization from now on.

## II. An Evaluation of the Economic Effect of Agricultural Mechanization

Based on an examination of the entire process of Heilongjiang's promotion of mechanization and its relation to agricultural production, we believe that the results should be considered positive and that the overall impact of mechanization is good.

Since the founding of the People's Republic, Heilongjiang's plowed acreage has expanded rapidly, its total grain output has increased constantly, and its contribution to the nation has been fairly great. In 1949-82 a grand total of 80.76 million mu of wasteland was reclaimed for an annual average of 2.447 million. Total grain output gradually rose from 11.55 billion jin in the early years after the founding of the People's Republic to an annual figure of 27.1 billion in the 1970's. In the past 30 years, the province has supplied the state with 68.1 billion jin of commodity grain for an annual average of 2.1 billion. There are, of course, many elements in the achievement of the above results, but in view of Heilongjiang's vast land area, small population and large area of wasteland, vigorous use of mechanization is doubtless one of the main elements. Furthermore, the province's farmland capital construction, development of water conservation resources, expansion of economic diversification and increased gross agricultural output value are all inseparable from the widespread use of mechanization in agricultural production and the consequent liberation of the rural labor force.

At the same time, we must also look at Heilongjiang's promotion of mechanization in terms of state investment, loans and commitment of goods and materials and in terms of the price paid by the peasantry. If we compare all of the above to the beneficial results of mechanization and the material benefits derived therefrom by the peasants, we should say either that the benefits are not commensurate to the costs or that they are unsatisfactory. This is concretely indicated by the failure of the rapid growth of mechanization to produce beneficial results at the same rate. Here are three reasons for this.

First, the direct purpose of promoting mechanization is to increase greatly the quantity of farm products. Thus the widespread use of mechanization must be coordinated with agronomic and biological measures and with engineering measures to improve growing conditions for farm crops. For a long time now, Heilongjiang's mechanization measures have been an "isolated force

penetrating deep into enemy territory" and have affected the full development of the advantages of mechanization. As a result, the modernized means of production are not yet able to create relatively high land and labor productivity.

Second, the liberation of the labor force, i.e., the substitution of machines for humans, is an inevitable result of the promotion of mechanization, but conservation of labor is not the ultimate goal. The only goal is to use the freed labor to march in deep and wide ranks toward agricultural production and thus create more material wealth. In step with the rise in the degree of mechanization, more and more of Heilongjiang's labor force have been freed from planting and growing. According to calculations by the province's Institute of Agricultural Mechanization, the agricultural labor force now numbers 4.38 million. Given the present degree of mechanization, a force of 1.96 million can satisfy the requirements for planting and growing. Of the remaining 2.42 million persons, 598,000 work in commune and brigade enterprises; 148,000 in forestry; 368,000 in animal husbandry; and 12,000 in fishing. This leaves 1.274 million that must be taken care of. Thus, on the one hand, mechanization has produced much surplus labor that still awaits disposition; on the other hand, agricultural management remains unitary. According to statistics from the end of 1981, farm output value accounted for 71.2 percent of agriculture's gross output value while forestry, animal husbandry, industry, sideline occupations and fishing had a combined share of only 28.8 percent.

Third, the range of farm machines is incomplete and is affecting the full development of the advantages of mechanization. The machines consist of many large and medium tractors and a few small tractors. Moreover, their disposition is not rational, nor is the ratio of power machines to work machine appropriate. "The head is big, but the tail is small." In addition, the work machines vary in model and are inferior in quality. This creates a low utilization rate for farm machinery, a narrow range of suitable uses and low benefits. For example, although the degree of mechanization in land reclamation on state farms is high, the problem of incompleteness still exists. According to an investigation by the Provincial Institute of State Farm Economics, reapers could only satisfy half the demand, seeders were too few in number and deficient in suitability and irrigators were not useful enough. As a result, the realization of the benefits of mechanization was affected.

### III. Problems and Lessons

Heilongjiang has traveled on a road of countless difficulties and setbacks in its promotion of agricultural mechanization. It has encountered both success and situations that still require urgent change.

In the first place, the province's mechanization work suffered from leftist influence. Before 1958, for example, two-wheel, double-share plows were blindly popularized. In 1958, too much emphasis was placed on bearings and on towing by rope. Later there appeared "the beginning of the masses' great effort on work reform" and other things. In terms of the real composition of the productive forces, the level of development of agricultural production, the province's natural conditions and provision of fuel by the state, Heilongjiang's "substitution of machines for horses" has suffered from prematureness

and overanxiety. Hence, Heilongjiang must now combine people, machines and animals realistically and use a machine or a horse whenever suitable. It must suit measures to local conditions, emphasize economic results, respect the masses' wishes and select a rational power composition that is economical, practical and favorable to the peasants.

In the second place, Heilongjiang still likewise tends to demand too much of mechanization, to be impatient for success and to pursue "wholesale mechanization" blindly. For example, Suihua County's Qinjia Commune basically satisfied its requirements for production with its farm machines and tools in 1978, with fairly good economic consequences. But during a period of more than 1 year, total investment in mechanization ballooned from 2.27 million yuan to 3.9 million for an average increase of 71.7 percent over investment per mu in 1978. This increase was too heavy a burden for the collective economy to bear, so by necessity there was recourse to loans to buy the machinery. The number of machines consequently increased, but income from production fell 23.2 percent, while the amount of grain for every 100 yuan invested in farm machinery fell 19.4 percent. A similar situation existed in Hailun County in 1979, when five production brigades were equipped according to the patters of "wholesale mechanization" and draft animals were disposed of. Results were poor, however, as production became difficult. In addition, different regions should have been treated with their differences in mind, not with arbitrary uniformity.

#### IV. Opening up a New Way

Heilongjiang's agricultural economy is now directly facing a new situation that makes new demands for agricultural mechanization. An important problem is how to adapt to this situation and seek a new way of development for the admustment and restructuring of mechanization work.

First, there was a new breakthrough in the promotion of the reponsibility system for agricultural production in Heilongjiang from the end of 1982 to the beginning of 1983. The "double contract" responsibility system with the household as its unit, originally applied to fewer than 10 percent of all households but expanded to 70 to 80 percent. The communes and brigades using this system have run into problems that now urgently require study and solution. In their general and specific problems, how can they bring mechanization into full play? In their forms of management and systems of administration of farm machinery, how can they adapt to the characteristic that the household is the unit and motivate peasants to use the machinery willingly?

Second, Heilongjiang's agricultural production is changing from expanding land and extensive cultivation to raising the per-unit area yield and to intensive cultivation. Another new problem for mechanization is how to develop the advantages of existing machinery and create the necessary prerequisites for high and steady yields of farm crops.

Third, Heilongjiang's agricultural structure must change from its sole emphasis on grain to "absolutely no slackening on grain production while vigorously developing economic diversification." This requires the extension of mechanization into the realm of economic diversification and the greater use of every machine that brings the best benefits in animal husbandry, forestry processing, transport and fishing.



Given the above strategic changes in Heilongjiang's agriculture, mechanization faces problems of adjustment and restructuring. The following are the focal points of restructuring:

1. There is the structural problem of the system of ownership of farm machinery. In the past, ownership took several forms, such as ownership by the production brigade or the production team or both and ownership by the commune. Along with the evolution of the responsibility system in agricultural production has also come ownership by the household and by several households jointly. Management by the large brigade, the small brigade and the commune alone and joint management by large and small brigades have expanded into multifarious management, i.e., by individuals or several households together and by collectives. In other words, the work is contracted out to households or organizations. The province must follow suit in restructuring the following: the supply targets for farm machinery; technical training; repair of machines and tools; and supply of spare parts, replacements and oil crops.

Management and service of farm machinery were contracted out either exclusively to farm machine brigades or jointly to farmland brigades and farm machine brigades under the past system of collective ownership and management of that machinery. This was fairly common in the one-crop (wheat or legumes) areas with much land and small population. But in areas of food grains other than wheat and rice, brigades dealing only with farm machinery work carried out their contracts poorly or not at all because of the crop variety and agronomic complexity. Moreover, the linking of planned output with remuneration ran into difficulties, in that what was set in spring often fizzled in fall. Most localities now have the household as their unit, so the system of management and service of farm machines must change accordingly. In this regard every place offers many good options, whose common characteristics are as follows: they put resolute effort into the contract part of farm machine management in order to arouse the farm machine personnel's enthusiasm and so help the maintenance of farm machines' and tools' excellent technical condition and safety in production; they implement socialized service, enabling every kind of responsibility system to use farm machinery; they charge fees according to the quality of their work; they are chosen by the masses for their fine service; and they manage by contract.

2. The composition of agricultural power must be adjusted. In its promotion of mechanization, Heilongjiang has long been adapting it to the province's own conditions of vast land, small population and plenty of reclaimable wasteland. It allocates a relatively large number of caterpillar tractors of great horsepower but few medium tractors and very few small ones. There are many power machines but few work machines. Many machines are used in planting and growing, but few are used in irrigation and economic diversification. Fuel supplies must be considered in the area of machine power vs animal power. According to statistics, in recent years the state has been showing a downward trend in supplying of diesel oil: it supplied an average of 68 kg per horsepower in 1978 and 40 in 1982. Heilongjiang's annual shortfall in diesel oil for agricultural use is about 170,000 metric tons. It cannot divorce itself from this situation by substituting machines for horses. Therefore, the province has an objective foundation for a power composition of both machines and animals that must not be rashly denied.

3. Appropriate completeness in farm machinery is key to the promotion of mechanization. In order to improve the present efficiency of farm machinery, Heilongjiang must consider financial and material conditions, as well as the requirements for production, and then selectively give priority to allocating highly beneficial farm tools urgently needed in production. Departments of farm machinery and industry must carry out good investigations, research and forecasting and give priority to manufacturing beneficial farm tools of appropriately wide scope, high quality and low price. In particular, the province needs tools for use in forestry, animal husbandry, sideline occupations and fishing in order to suit the expansion of its agricultural economy.

4. The improvement of the economic results of the use of mechanization is the principle and the ultimate goal of restructuring in the area of farm machinery. The benefits of mechanization must be considered from both macrocosmic and microcosmic perspectives. From the latter we should stress completeness of farm machinery, management of its use and the necessity of traveling on a new road that is economical, practical and beneficial to the peasantry. From the former we must unite the benefits of mechanization with the strategic goals of the agricultural economy. Our main tasks in realizing mechanization must be the improvement of per-unit area yield and the proper establishment of high-yield and steady-yield commodity grain bases. The development of mechanization must be considered along with the general goal of comprehensive development of forestry, animal husbandry, sideline occupations and fishing and with the planned disposition and use of the labor force. The labor freed by mechanization must be used in the development of commune and brigade industry and economic diversification, thus creating more social wealth and increasing peasant income. In sum, we must make agricultural mechanization an important means of comprehensively developing Heilongjiang's agricultural economy.

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